

DENTAL SURGERY

FOR

MEDICAL PRACTITIONERS



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TO
MY FATHER
THIS VOLUME IS DEDICATED
As a token of
MY LOVE
and
MY DUTIFUL RESPECTS

PREFACE

I need hardly mention that this small volume does not claim to ha a complete treatise on Dental Surgery. In it I have attempted to describe as briefly and in as practicable a way as possible, all such salient points as would be useful to medical students and practitioners. The chief object of this volume is to acquaint a medical practitioner with such knowledge of dentistry as would enable him to appreciate the importance of dental aid as a preventive and curative factor in the treatment of medical and surgical diseases, and occasionally to afford immediate dental relief where efficient dental help may not be available; and not to teach him dentistry to enable him to practise it.

In compiling this volume, for it is more a compilation than an original work, I have consulted the works of several famous authors, and the articles in various dental journals. For all the information derived from these works and articles, I beg to tender my best thanks to the authors and publishers of these works and articles. I trust these gentlemen will accept this collective acknowledgment of the use made of their writings.

Besides these gentlemen my best thanks are also due to my friend Mr. T. A. Vakil for his very valuable assistance in reading and correcting the manuscript and proof sheets.

JAMESHEDJI JIVANJI MODI.

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CHAPTER I.

HISTORY OF DENTISTRY IN INDIA.

Writing on the subject of Dentistry, a few words on the history of Dentistry in India will not be out of place here. To find out its antiquity and its practice amongst the ancient Aryans one must look into the origin and progress of Indian medicine amongst the old Hindus. As like all the European nations, the Hindus also consider the science of medicine to be of Divine origin, naturally one has to look into their religious scriptures for its history. This history we find in their famous religious books called the Vedas, which were written in such remote antiquity that they are spoken of by the Hindus as eternal. These Vedas comprise of several volumes, and each of them dealing with different sciences. The book that treats of medicine is called "Ayur Veda" i. e. the science of Life. As early as that period of the Vedas, Dentistry was practised by the ancient Aryans. And it consisted of practically all the dental operations known to the present day Dentistry viz. lancing of the gums; extractions of teeth with forceps and elevators; filling of teeth with silver and gold; removal of tartar; fitting of artificial dentures; and ligaturing of the teeth. In the chapter of general hygiene there are found some very lucid and perfect instructions about the hygiene of the mouth. In the light of the present day discussions about the diets and their effects on the teeth, it will be interesting to quote here some instructions about the diets and care of the mouth given by the old Hindu dentists to their patients. They were "Take soft viands first, hard buteracious food in the middle, and the liquids at the end of the meals. Similarly sweets must be taken first, and the acid or pungent things last. It was also enjoined that there should be no hurry over the meals.

and that the food must be well chewed. Also that the mouth must be scrupulously cleaned from inside and out after each meal, and that the food particles must be picked out from between the teeth by tooth-picks." What better instructions on oral hygiene, and what better dental help, have the present day dentists to offer to their patients than these given by the Hindu dentists of such hoary past to their patients. As dentistry was well understood and practised by the ancient Hindus, so were also general medicine and surgery. Such clever and tricky operations like Rhinoplasty, the removal of the Cataract in capsules, and all operations of Abdominal and Brain Surgery were practised by them. Edward Jenner and William Harvey are credited with the discovery of inoculation for small-pox and circulation of blood but they have only rediscovered what was once known to the Hindu doctors of thousands of years ago, for they are well described in the Ayur Veda. The germ-theory of all the diseases, and the theory of Immunity which have only come in very lately in Western Medicine, was not unknown to them; for there is a whole chapter on Bacteriology. Even the treatments like Massage, Hydropathy, and Mesmerism were known to Indian Medicine. So perfect was the old Aryan Medicine that its name and fame spread to European Countries. As early as 500 B. C. Greek authors have referred to Indian medicine. Claudius Galen, the father of modern European Medicine, who has been credited with the first explanation and description of the pulse, seems to have borrowed it from the Hindu system of medicine; for there is a similar description in that literature which was written much before Galen described the pulse. With this migration of the old Hindu Medicine, perhaps also migrated the Science of Dentistry to the Western lands. If that saying "Nothing is new under the Sun" is true, and true it is, it is possible that modern dentistry is the re-birth of the old Aryan dentistry.

CHAPTER II.

EMBRYOLOGY OF THE MOUTH

The earliest indication of the mouth cavity can be detected at the 12th day of the intra-uterine life. It remains a close cavity separated from the alimentary canal by a membrane till about the 3rd week, when it disappears bringing the mouth into communication with the alimentary canal. About the 5th week the mandibular processes unite to form the mandibular arch; and a week later union takes place between the Naso-frontal, Lateral-nasal, and Maxillary processes of the upper jaw. From the Naso-frontal processes are formed the central portions of the Premaxilla (*Endognathia*) *i.e.* the portion carrying the Central Incisor teeth, the corresponding portion of the upper lip, the septum and the bridge of the nose. From the Lateral-nasal processes are formed the lateral portions of the Maxilla (*Mesognathia*) *i.e.* the portion carrying the Lateral Incisor teeth, the corresponding portion of the upper lip, and the alæ of the nose. These processes with the Naso-frontal processes complete the Anterior nares. The greater portion of the Maxilla (*Exognathia*) results from the metamorphosis of the Maxillary processes. This portion supports the rest of the teeth; and likewise forms the Zygomatic and Palatine bones, corresponding portions of the lips and cheeks, and that portion of the future palate (except that portion that is formed by the Premaxilla) thus closing the mouth from the nose cavity. The Mandibular processes form the Mandible, the lower lip, and the chin.

Cleft Palate.

The fusion of the internal prominences of these processes commences at the 8th week and is completed about the 11th

week. The failure of fusion of these processes results in the condition called the cleft-palate, which may vary from Bifid Uvula to the partial or complete cleft. When the cleft is complete it passes between the Central and Lateral incisor teeth as these teeth are situated in the different portions of the maxilla; the central incisor being in the Endognathium, and the Lateral incisor in the Mesognathium. The fusion of these portions of the upper palate starts at the site of the Anterior Palatine foramen, and extends forwards and backwards, the lips and the uvula being the last to unite. Thus cleft-lip and cleft uvula may exist without the involvement of the palate; whereas the reverse condition *i. e.* cleft palate with entire lip and uvula is not possible for developmental reason given above. The lower jaw is the result of the metamorphosis of the mandibular processes which fuse in the middle line at about the 35th day.

Development of the Teeth.

It begins during the 6th week of the intra-uterine life. It begins with an inflexion of the epithelial layer (Ectoderm) in that position of the alveolar border where the future teeth erupt. From this inflexion, thickened portion of the same (Dental lamina) are thrown out deeper where the future teeth are to be formed. These thickened formations are called Enamel organs. About a week later the Mesodermic tissue about the Enamel organ rises in a papilla like form to meet, and insert itself in the Enamel-organ causing it to assume a bell shape. This dental papilla assumes the form of the tooth it is going to form. It not only inserts itself in the Enamel-organ but also surrounds it, and in that situation is called the Tooth-follicle. While this process of the formation of temporary teeth is going on, the Dental-lamina grows further down into the jaw, forming the Enamel-

organs for the permanent teeth which begin to form at the age of 5 months of the intra-uterine life.

Structures of the Tooth.

A tooth is composed of

1. Enamel
2. Dentine
3. Tooth-pulp
4. Cementum
5. Periodontal membrane.

Enamel.

Enamel is formed from that part of the Enamel organ which is nearest to the dental-papila. This part is called the layer of Internal enamel cells or Ameloblasts.

The Deposition of enamel takes place from within outwards i.e. oldest layers are innermost. Enamel is the outermost part of the tooth. It covers the Dentine in the crown of the tooth. It is the hardest tissue in the body. It is composed of rods or prisms impregnated with Calcium salts. These prisms are embedded in a matrix which has no organic matter in it. This is the reason why (as will be shown later) it absolutely crumbles away under the action of acids or the decay (caries) of the teeth. It is thicker on the cusps than in the pits or the sides of the tooth.

Dentine.

Dentine is formed from the cells called Odontoblasts, that line the periphery of the dental-papila and which come in contact with the Enamel. Its deposition takes place from

without inwards *i. e.* the oldest layer is outermost. Dentine forms the bulk of the tooth ; and gives the tooth its form. It is hard, highly elastic, slightly yellow, and translucent. It is composed of tubes called **Dental tubules**, radiating from the pulp cavity to the surface, and the organic matrix which is impregnated with calcarious salts chiefly calcium salts which give it its hardness. The dental tubule is occupied by a minute soft protoplasmic fibril called **Dentinal fibril** which is continuous with a cell (**Odontoblast**) upon the surface of the tooth pulp. The nature of these fibrils is not well understood. Though they are not nerves in the ordinary sense of the word, yet they perform the functions of a sensory nerve. Sensitiveness of the dentine is due to these dentinal fibrils.

Tooth Pulp.

It is formed from the dental-papila, and is the formative organ of the Dentine. It consists of connective tissue fibres, enmeshing the embryonic cells. These cells are specialised on the periphery of the pulp, and are called the **Odontoblasts**. It is this layer called **Membrana Eboris**, of specialised cells (**Odontoblasts**) that, forms the Dentine. It is a very highly vascular structure. Three or four arteries and nerves enter this structure. They break up ultimately into a capillary plexus just under the **Membrana Eboris**.

Cementum.

Cementum is formed from the inner of the two layers of the **Dental-Sac** or **Follicle**. It begins forming after the Enamel and Dentine are completed. It forms the outer coating of the roots of the teeth. It consists of calcified matrix and contains vascular canals similar to **Haversian**

canals in bones. These vascular canals are called **Cement Corpuscles**. They contain some protoplasmic substance, which is supposed to be responsible for the sensitiveness in the Cementum. The offshoots of these Corpuscles near the surface of the cementum, communicate with similar protoplasmic bodies in the **Periosteum** and it is through this communications that the tooth is kept alive and firmly fixed to the bony socket when the pulp, the main source of the nutrition of the tooth is dead. On the outside, the Cementum is adherent to the **Alveolo dental periosteum**, and on the inside to the Dentine by means of some connective tissue fibres called **Sharpey's fibres**. Cementum is thinnest near the crown of the tooth, and thickest at its apex. It grows with age i. e. it is thicker in an adult than in a child; and thicker in an old man than in an adult. In man Cementum covers the roots of the teeth only, but in some animals it covers also the crowns.

Alveolo Dental or Periodontal Membrane.

It is formed from the outer of the two layers of the Dental follicle. It consists of the connective tissue fibres, and is rich in nerves and bloodvessels. This nerve and blood supply is derived from the vessels of the gums, vessels of alveolar wall and vessels passing into the tooth from the apical space. It binds the tooth to the bone of the socket by means of **Sharpey's fibres**. The fibres of this membrane are arranged obliquely from the bone to the Cementum of the tooth, thus forming a sort of a suspensary ligament to allow some slight mobility to the tooth.

Calcification of the Tooth Structures.

Calcification is the process of hardening, by the deposition of calcarious salts, of the hitherto soft tooth structures.

It starts in the Enamel and Dentine of the deciduous or temporary incisors at about the 17th week of intrauterine life, and in the molars a little later. Calcification of the cementum takes place later than in Enamel and Dentine, as the Cementum is not formed till after the others are completed. At birth most of the crowns of the front temporary teeth are calcified, and so are also the cusps of the canines and the masticating surfaces of the temporary molars and the first permanent molar.

As the teeth are beginning to form and get hardened, when the child is still within the mother, it follows that for their good development the mother's health must be quite good; and it can be only as good as her mouth. Naturally the prophylactic treatment of the child's teeth and mouth must begin with the mother when the child is forming within her.

When the teeth of the first set are being formed and calcified during the intrauterine life, the teeth of the permanent set are also being formed from the elongation of the same tooth band as gave rise to the deciduous teeth. The rest of the process of development is the same as in the deciduous teeth.

CHAPTER III.

ERUPTION OF THE TEETH.

Teething.

Given normal conditions of the development and calcification of teeth; and healthy general condition of the body, the teeth become ready to appear in the mouth at the age of 6th-7th month, and Teething or eruption of the teeth begin. Why and how these teeth erupt is not definitely known, but there are certain ingenious theories advanced to explain the process. They are

1. Eruption of the tooth due to the elongation of its root.

The facts that upset this theory are

- (a) That teeth with stunted roots have erupted to their full height.
- (b) Teeth with well formed and long roots have not erupted, and remained embedded in the jaws for the life time; or erupted very late in life.
- (c) The disproportion between the distance travelled by the tooth during eruption, and the depth of tissue added to the end of the root during that time.
- (d) The altogether different method of eruption of the teeth in Crocodiles and other Reptiles. It is a force quite independent of the elongation of their length.

2. Deposition of fresh bone-tissue on the floor of the tooth socket.

The fact that no such bone formation is seen under a microscope, is against this theory.

3. Bone-current, *i.e.* general growth and advance of the bone towards the surface, carrying the teeth with it. This theory suggests the resemblance of this process to the shedding of the roots and sequestra of bone; but no evidence of such bone formation is seen under a microscope.

Age and order of the Eruption of Deciduous Teeth.

The teeth of the temporary set are 20 in number and they erupt at different periods and in particular order as shown below:—

| | | | | |
|------------------|-----|-----|-------|---------|
| Central Incisors | ... | ... | 5-8 | Months. |
| Lateral " | ... | ... | 8-10 | " |
| First molars | ... | ... | 12-16 | " |
| Canines | ... | ... | 14-20 | " |
| Second molars... | ... | ... | 20-36 | " |

The lower teeth erupt before the corresponding teeth in the upper jaw, with the exception of the Lateral incisors which erupt after the upper Lateral incisors have erupted. This dentition starts earlier and finishes sooner in girls than in boys. From this table it will be seen that the teeth erupt in groups, with intervals of about 2-6 months, there being longer intervals between the eruption of the back teeth. This dentition (eruption of the teeth) is a physiological process and is one of the Critical-periods in the cycle of human life; and like other Critical-periods such as

Puberty, Uterine gestation, and Menopause is attended with exaggerated nervo-vascular function, which may easily culminate into a pathological condition. The cases culminating into pathological conditions, are many and they could have easily been more if it were not for these intervals between the eruption of the groups of teeth. In these intervals, the child is allowed a chance of recuperation of the nervo-vascular energy spent in the eruption of the teeth.

Signs of Normal Dentition.

They are—

1. Distinct outline of the tooth felt under the gum.
2. Gum whitened and elevated over the erupting tooth.
3. Increased flow of saliva. This is due to the physiological irritation at the time, and to the increased activity and growth of the salivary mechanism preparatory to the change in diet needed at that age.
4. Tendency of the child to rub the mouth, and to bite at hard things.

Under ordinary conditions this process of teething may pass away quite unnoticed, but as is generally the case, the majority of children suffer from certain pathological conditions. Before considering these pathological conditions, a few words on the constitutional conditions affecting the dentition will not be out of place.

These conditions are—

- (1) Congenital syphilis. (2) Rickets. (3) Idiocy.

Congenital Syphilis.

There is early eruption of the teeth in children afflicted with this disease; and it is not uncommon for them to be born with one or two teeth in place. The early eruption of teeth as a sign of congenital Syphilis is now discounted by several syphilographers who now maintain that in fact eruption is delayed in these cases. This is not a certain sign of this disease, for there are instances noted of people absolutely free from this disease, having been born with teeth. Richard III of England, Louis XVI of France, and Mirabau, the famous French revolutionist, are said to have been born with teeth. To ascertain the presence of congenital syphilis, the following dental stigmata which are pathognomonic of this disease, must be looked for:—(1). Hutchinson's Teeth. (2) Cuspal atrophy of the first permanent molar, (3) Multiple systemic lesions of the permanent teeth, (4) The multiple and systemic lesions of the temporary teeth, especially the cup-shaped erosions of the molars. Breast-fed children usually erupt teeth earlier than those fed on other milk. This is due to the rapidly and easily assimilable substances in the human milk. There is a case noted of a child having a complete set of milk teeth at birth.

Rickets.

In this condition the eruption is usually delayed. It is supposed to be due to the thickening of the Dental-follicle.

Idiocy.

In this condition also the eruption is very much retarded. This is supposed to be due to the fact that the brain

and teeth both being ectodermic structures, are liable to the same tissue disturbances.

Diseases in relation with first Dentition.

They are Local and General.

Local.

Stomatitis.—*i. e.* inflammation of the mucous membrane of the mouth cavity.

Signs and Symptoms.

1. Swelling of the gums.
2. Redness and heat in the part.
3. Increased salivation.
4. Child is restless; but feels more comfortable in sitting posture.
5. Slight rise of temperature.
6. Tendency of the child to rub the gums.
7. General wakefulness and sudden awaking with a cry.

When the condition is severer there might occur—

8. Ulceration of the gums and mucous membrane.
9. Foul breath from the mouth.

Treatment.

In early stages open out the bowels, clean the mouth, and apply some friction to the gums. If the symptoms

still persist incise the gum over the erupting tooth to relieve the tension. In the ulcerative stage clean the mouth with Mel-boracis (borax 1 oz. honey 1 oz.) or Glycerine of borax. Chlorate of Potash X grs. to an ounce may be added to it with great advantage. In severe cases it may also be prescribed internally in 2 gr. doses. Ulcers may be touched with Silver-nitrate or Carbolic acid.

General.

Teething, like all other Critical-periods, is attended with increased irritability of the nervous system and lowering of body resistance. Thus it subjects or predisposes the individual to pathological conditions in the part that is naturally weak. In infancy the nervous system is highly predominant, and the slightest peripheral irritation is apt to cause a general disturbance. There is no system in the body that is not affected during this critical period and the affections caused are in:—

1. *Alimentary System:*

Diarrhœa, constipation, vomiting.

2. *Respiratory System:*

Bronchitis and cough.

3. *Nervous System:*

Sleeplessness, screaming attacks, epilepsy, convulsions, trismus of the jaws.

4. *Skin:*

Facial eczema and herpes.

5. *Urinary System:*

Polyuria, anuria, and discharges like that of gonorrhœa.

Whatever the symptoms are, they disappear as soon as all the teeth of the group that is erupting are out. They may or may not re-appear at the time of the eruption of the other groups.

Treatment.

Before treating the subject of treatment a few remarks on these troubles mentioned above will not be out of place. It is generally believed by parents and medical men that these troubles are the physiological sequence of the process of Teething; but now it is proved by those dealing with the diseases of children that they are more due to the unclean condition of the mouth at the time of teething than to teething itself. So naturally the first care of the medical man must be to avoid the troubles coming in by keeping the mouth clean from the very birth of the child. Though teething is undoubtedly an indirect or a predisposing cause of these ailments, yet its effects on the health of the child are very much exaggerated in their importance, and the diseases occurring simultaneously with the eruption of the teeth are in many cases wrongly ascribed to the process of teething. Teething as an explanation of the symptoms is too often a cloak for the ignorance of the medical man, of the right cause of the trouble. Choleric diarrhœa, high fever and cough of double pneumonia have often been lightly diagnosed as diarrhœa and fever due to teething. It is always advisable to think of all the causes that might produce the trouble, and only on failing to find any such cause, and if the child is of the age when it is likely to cut the teeth, to think of teething as the very last cause of that trouble. Having ascertained teething as the cause, treat it.

Treatment.

1. Avoid weaning the child.
2. Avoid sudden changes in the diet.
3. Avoid exposure to sudden changes of temperature.
4. Avoid unclean bottles.
5. Restrain the child from sucking undesirable articles.
6. Do not give teething powders. They are very injurious to children. They contain Mercury and Opium, the very two drugs that are contraindicated for children. It is argued in favour of these powders that they sooth the child and make it quiet. The child becomes quiet because it is made too ill by these powders to be otherwise.
7. Avoid vaccination at the time.
8. Wipe the gums and the mucous membrane clean after every feed with Glycerine of Borax or Mel Boracis on a piece of coarse cloth. In severe inflammation of the mouth Chlorate of Potash (10 grs. to an ounce) may be added to it. It may also be given internally in 2 gr. doses.

This treatment failing,

9. Incise the gum over the erupting tooth.

M. Ambroise Pare to whom are attributed those famous words "*I merely try, it is God that cures*" was the first to suggest this operation of Lancing i.e. incision of the gums. It is a useful operation but unfortunately it is often misused by medical men and unqualified dentists. Instead of being a rare operation it is unfortunately very frequently used by these men. Some use it as lightly as they diagnose teething as the cause of the trouble they are called upon to treat. More often than not, it is used greatly in

advance of the stage when it may be needed, and consequently does more harm to the patients than any good. When done before time the wound heals up by granulation and cicatrisation. This cicatricial tissue offers greater resistance to the erupting tooth than the normal gum tissue.

Technique of the Operation.

The child must be placed in the lap of a nurse or assistant sitting opposite the operator. The operator must take the head of the child in his lap and firmly fix it before the operation. Then with a hatchet blade lancet, or a curved bistoury duly protected, the gum over the tooth must be cut down till the lancet touches the enamel of the tooth. A crucial incision should be put in the case of the back teeth, and a straight incision more anteriorly than posteriorly in case of the front teeth, and then free the flaps from the surface of the tooth or cut them away.

At the end of 2-2½ years the deciduous or temporary dentition is quite complete. Then when the child reaches the age of 6-7 they begin falling out of the mouth making room for the teeth of the second or permanent set.



CHAPTER IV

SECOND OR PERMANENT DENTITION

Teeth of the permanent set are 32 in number, 16 in the upper and 16 in the lower jaw. Of these the Incisors, Canines and Premolars have their predecessors in the temporary set; while the molars have no such predecessors. Permanent teeth appear in the place vacated by the temporary teeth which fall out by a process of absorption of their roots.

Absorption of the Temporary Teeth.

Why and how this absorption takes place is not well understood; but there are some theories offered by some people to explain this process. The two of these that most explain this process are:—

1. That absorption of the roots is due to the pressure of the succeeding tooth.

2. That it is due to the formation of a mass of large multinucleated cells, known as the Absorbent Organ.

The first theory found its origin in the fact that absorption is usually found on the surface that is nearest the succeeding tooth. There are however some facts which are against this theory. They are:—

a. That not unfrequently there persists a bony partition between the socket just vacated by the temporary tooth and the incoming permanent tooth.

b. That temporary teeth often persist even after the eruption of their successors in the permanent set.

- c. That often the time of the absorption of the temporary teeth does not synchronise with that of the incoming one, as it must, if pressure be the cause of absorption.

The second theory is better accepted for it is borne out by the observations under the microscope. A group of multi-nucleated cells called the *Absorbent Organ* is always seen in the place of absorption, irrespective of the presence or absence of the succeeding tooth.

Order and dates of eruption of the permanent teeth.

| Teeth. | | | Dates of Eruption. | |
|---------------------|-----|-----|--------------------|-----------------|
| 1. First Molars | ... | ... | ... | 6th year |
| 2. Central Incisors | ... | ... | ... | 7th " |
| 3. Lateral Incisors | ... | ... | ... | 8th " |
| 4. First Premolars | ... | ... | ... | 9th " |
| 5. Second Premolars | ... | ... | ... | 10th " |
| 6. Canines | ... | ... | ... | 11th " |
| 7. Second Molars | ... | ... | ... | 12th " |
| 8. Third Molars | ... | ... | ... | 18th-25th year. |

These are the approximate dates at which these teeth erupt, and very often there occurs diversion from these dates. Of all the teeth the third molars are the most irregular in their time of eruption. They erupt at any time between 18-30 years and even at a later date than that. In one instance it is noted to have erupted at the age of 73. The author had a similar experience in the case of a lady aged about 65. But unfortunately owing to the old age and

very weak condition of the patient, for she was a chronic invalid confined to bed for well nigh twenty years, she could not cut that tooth which was distinctly felt underneath the gum tissue. As a rule lower teeth erupt before the corresponding upper teeth with the solitary exception of the Premolars. Since the penetration of the gum a tooth takes about a year to fully erupt into occlusion. Roots of the teeth are not completed till about three years after the eruption; but the root of the 3rd molar is complete at the time of eruption. The pathological disturbances met with during the first dentition are usually absent during the period of eruption of the second set. It is because

1. The process of eruption of the permanent set is a more gradual process than that of the deciduous set, and so does not need such sudden expenditure of oervo-vascular energy as in the case of the first dentition.

2. The child is much stronger at the time of the second dentition.

3. The child at that stage is less susceptible to the effects of nervous irritation.

Though the pathological disturbances incidental to the first dentition are absent at this stage, some severe disturbances sometimes do occur locally in the mouth and in the adjacent parts. They are usually confined to the eruption of the 3rd molars particularly the lowers; and are always due to the want of room in the jaws for these teeth. So, before these disturbances are considered it will be interesting to see how this room for the bigger teeth and greater number of teeth of the second set is produced in the jaws.

The Development of jaws, and the arrangement of the teeth during the second dentition.

To accommodate the greater size and number of the teeth of the second set, the jaws are constantly but gradually developing during the whole period of the second dentition. The upper jaw grows bigger by the deposition of fresh bone on its outer surface, and by the expansion of the nasal passages and air sinuses in it. The lower jaw grows by the deposition of fresh bone on the outer surface of the body of the bone, and on the posterior surface of the ascending ramus. While the deposition is taking place on the posterior surface of the ascending ramus, there is absorption of bone taking place from its anterior border, thus widening out the angle of the jaw, making more room in the mouth. The freely mobile condition of the muscles of the tongue, lips and cheeks also help in making the room in the mouth by expanding the bony and dental arches. Further room is obtained by the arrangement of the teeth of the second set, in a greater segment of the arch than that attained by the temporary teeth; and also by their assuming more oblique direction than that assumed by the temporary teeth.

Disturbances incidental to the second dentition.

As said above they are mainly found in connection with the 3rd molars, and more especially the lowers. Symptoms presented are

1. Swelling, redness, and heat in the gum over and about the erupting tooth.
2. Sometimes suppuration and ulceration of the gum tissue.
3. Slight rise of temperature.

4. When the condition is severe, there is inflammation and swelling of the adjacent soft tissues, thus causing the closure of the mouth.

This closure of the mouth or Trismus as it is wrongly called, is due to the spread of the inflammation to the adjacent soft tissues *i.e.* the Temporal and Pterygoid muscles and other soft tissues; and not to the reflex irritation as it was formerly supposed to be. This is proved by the following facts.

- (a) That general anæsthesia cannot produce the relaxation, which it must if the closure was only due to the reflex irritation.
- (b) The trismus or the closure continues even after the removal of the cause *i.e.* the offending tooth. Trismus should disappear with the removal of the cause if it be due to reflex irritation.

Serious affections in relation with the 3rd molar.

They are

- A. *Inflammation of the Inferior dental nerve and artery*, owing to their close proximity to the apex of that tooth. They get involved in the inflammation about that tooth. Their proximity to this tooth is so close that they sometimes (of course very rarely) actually pass through the root of this tooth. Under such circumstances they stand the risk of being ruptured during its extraction.

- B. Inflammation of the soft tissues of the Fauces and the Pharynx.** There is an interesting peculiarity with the inflammation round the 3rd molar, and that is that it always travels backward in the throat, and never forward. It is indeed peculiar that the 2nd molar, though in such close proximity to the site of inflammation, is almost always free from it. It is due to that tendency of the inflammation to travel backwards, and not forward.
- C. Severe inflammation of the surrounding tissues.** Muscles generally involved in this inflammation are the *Temporal* and *Pterygoid*, and not the *Masseter* as is usually believed.
- D. Necrosis.** This generally occurs after the extraction of the tooth, and is due to the stripping of the muco-periosteum, which is very closely adherent to the neck of the tooth.
- E. Ludvic's Angina i.e.** the inflammation of the cellular tissue under the jaw and between the two layers of the *Cervical facia*. It is due to the direct spread of the inflammation about the 3rd molar to this part. It is a very serious and almost always fatal condition. The fatality is due to the resulting toximia and œdema of the *Glottis*. By this œdema the *Glottis* loses its function, and consequently causes death by asphixia.
- F. Retropharyngeal abscesses.** They are due to the extension of inflammation or actual pus into the walls of the *Pharynx*.

- G. Abscesses in the neck and above or under the Clavicle. They are due to the extension of the inflammation or pus outwards and downwards between the *Cervical fascia* and the *Platysma Myoides*.

Treatment.

In early stages prescribe hot water, or hot poppy-head water gargles, and counter-irritation to the gums in the form of paint consisting of

R.

Tinc. Iodine

Tinc. Aconite

Spirits of Camphor

an equal parts.

The water used must be as hot as the patient can bear and not lukewarm. On no account use the fomentation outside the mouth. This failing, incise the gum over the tooth. Care must be taken not to incise too early. Incision failing to relieve the symptoms, remove the offending tooth. It is not always easy to get at that tooth, it being impacted behind and against the 2nd molar. When so impacted it eats into the back surface of the 2nd molar and causes severe pain (*Odontalgia*) by exposing the nerve in that tooth. In such a case it may need the removal of the 2nd molar. The symptoms may disappear with the removal of that tooth, but if they still persist, the offending tooth may also be removed at a later date. In case of severe inflammation the wound should be kept open for sometime after the extraction, by frequent irrigations with antiseptic fluids like Hydrogen Peroxide. Sometimes severe pain comes on after

the extraction. This may be due to the close promixity of the *Inferior dental nerve*, or to the exposure of the nerve in the 2nd molar caused by the impaction of the offending tooth. The second condition is more often responsible for that pain than the first.



CHAPTER V

VARIATIONS IN SIZE, NUMBER AND
STRUCTURE OF THE TEETH.

Variations in Size.

Teeth vary very much in size; upper Central incisors and Canines, and lower Premolars are the teeth that generally grow larger, and the Lateral incisors generally tend to be smaller in size. When they are larger in size, they must be recognised from *Geminated teeth* *i.e.* two teeth joined together. When smaller in size they must be distinguished from the temporary teeth, which can be distinguished by

1. Abrupt termination of the enamel at the neck of the tooth.
2. Marks of use (attrition) on the cutting and grinding surfaces.
3. Smaller size.
4. Translucency of the enamel.

Variations in number.

It is more common to have an excess than a deficiency of the usual number. When they are in excess they are called the *Supernumerary teeth*.—These teeth may resemble the normal teeth or may be abnormal in form. When normal in form they are generally found in the regions of the upper Lateral-incisors. When abnormal in shape they are generally found in the median line in the front of the mouth. They are more often found in the upper jaw, than in the lower jaw. They are generally

Bilateral i.e. found on both sides. When found in the back of the mouth they are almost always in the regions of the 3rd molar, and mostly placed on the outside of them.. Except under rare conditions they must always be removed.

Deficiency in number.

It is not uncommon to come across the congenital absence of one or two teeth or an entire group of teeth. The teeth that are most absent are the 3rd molars; and next to them are the upper Lateral-incisors. The writer is an example showing the absence of the whole group of 3rd molars in his mouth. He has seen several cases of the absence of the upper Lateral-incisors. The radiograph of one of them showed fully developed teeth embedded horizontally inside the jaw. A few cases are known of the entire absence of all the teeth. One example of it was that *Hairy man of Burma* who was examined by the Anthropological Society of Bombay a few years ago.

Variations in Structure.

Two classes:

1. Those occurring during Calcification and before they are erupted.
2. Those occurring after Calcification and eruption; and usually caused by the pathological processes in the periodontal membrane.

These variations in the tooth structure are due to the defects in the blood supply. These defects may be in the form of its defective composition, or its being charged with certain organisms or their toxins. Naturally Rickets and

Syphilis being essentially the blood-diseases, are the most likely diseases to cause the disturbance in the structure of the teeth. This defect in structure may vary in extent from the mere staining of the enamel to the formation of pits and groves in the enamel, and even to quite altered formation of the whole tooth as in case of Hutchinson's teeth. This condition of the defective tooth structure (Hypoplasia) generally affects the permanent teeth. It is also sometimes found in the temporary teeth, and then it is due to some severe constitutional disturbance in the mother during the period of calcification of these teeth i. e. the latter part of the intra-uterine life of the child.

Hypoplasia may be

- (1) General i. e. more than one or two teeth being involved, and due to the general constitutional disorder.
- (2) Local i. e. affecting one tooth, and due to severe local disturbance.

General Hypoplasia.

Teeth generally affected are the Incisors, Canines, and the Molars. The parts of the teeth affected are those that were undergoing calcification at the time of the severely disordered nutrition, that caused the defects.

Syphilis.

It is one of the conditions of disordered nutrition that causes hypoplasia. It generally affects the permanent teeth, but it sometimes affects the deciduous teeth as well. The permanent teeth mostly affected by this disease are the Incisors, Canines, and Molars. The characteristics of

the front teeth affected by Syphilis (Hutchinson's teeth) are

1. They are bluish in colour.
2. They are barrel-shaped.
3. They are smaller in size.
4. They are notched at the cutting edge.

The notch in the cutting edge is the diagnostic characteristic of the syphilitic tooth. Its formation is due to the mal-development of the middle of the three cusps usually present on the edge of a newly erupted tooth. Though the notched-teeth (Hutchinson's teeth) are characteristic of Syphilis, yet it would not be wise to diagnose the trouble from the notches alone; for these notches can also be produced in cases of hypoplasia due to causes other than Syphilis. For the definite diagnosis of Syphilis signs and symptoms other than Hutchinson's teeth must be looked for. The other conditions that may cause Hypoplasia are Rickets and any severe febrile or nutritional disturbance to the mother during the latter part of that pregnancy.

Local Hypoplasia.

It affects one tooth, and may be due to

(1) The inflammation or suppuration at the apex of the overlying deciduous tooth, at the time of the formation and calcification of the affected tooth.

(2) Injury inflicted on the affected tooth] by the injudicious extraction of the overlying deciduous tooth.

CHAPTER VI

IRREGULARITIES OF THE TEETH.

In this condition the normal arrangement of the teeth in the regular dental arch is upset, and some teeth are either pushed outside or inside the arch, because of the want of room for these teeth in that arch. The causes that are responsible for this want of room are:

General Causes.

1. **Modern Civilisation**—It is a common experience of the student of human anatomy that the mouths of the ancient people, and the modern uncivilised or primitive nations are free from these irregularities as compared to the present generation. Even in this generation people of the lower grades of Society are more immune from this trouble than those of the upper and more advanced classes, because of the former having broader jaws than the latter. The diminution in size of the jaws of the present generation is due to the present civilisation, and is produced through the blood supply. The brain and the jaws derive their nutrition from the same source *i.e.* the *Carotid* arteries. The strain of modern education and in fact all the environments of modern civilisation, entailing greater exertion upon the brain, necessitates a bigger supply of blood or nutrition to that part. This increased supply of blood to the brain is derived at the sacrifice of the osseous structures of the jaws and teeth; and as the result of which these structures have degenerated.

2. **Modern cooking**—The present generation of men, having taken to softer and better cooked food than their

ancestors used to have, do not now need the powerful and big jaws of their forefathers. Modern cooking calling forth less exertion on the part of the jaws and teeth to masticate that food, indirectly robs them of a certain amount of nutrition, thus causing the dwindling of the size of the jaws, and the number of the teeth. Man's dentition has fallen to 32 from the former normal Mammalian dentition of 44, and still shows a tendency to fall lower. It is not uncommon now a days to find only 28 teeth in human mouths.

3. **Selective breeding:**—This cause entirely owes its existence to the weakness and predilection of men for girls with pretty faces i.e. narrow tapering faces, with pretty looking small mouths with not much room in them for ample dental arches. Thus seeking pretty faces, men unconsciously become responsible for the infliction of this trouble on their children.

4. **Race-crossing:**—Race-crossing or cross-marriages between different nations having their own peculiar characteristics, tend to produce the mixture of these characteristics in their offsprings. Thus it is plain, that if a man of a nation with big jaws and big teeth, marries a girl of another race with small jaws and small teeth, their offsprings will develop in them a mixture of the characteristics of both the parents i.e. the small jaws of the one and the big teeth of the other, and consequently the irregularity of teeth in their mouths.

5. **Heredity:**—Heredity sometimes plays a part in this trouble. Certain irregularities are undoubtedly handed down from generation to generation, thus practically becoming a family trait.

Local causes

1. **Premature removal of the temporary teeth:**—The eruption of the teeth of the second set in regular arch depends so much on the condition of the temporary teeth, that it is very important to keep them in quite a healthy condition, and so to make them last their full span of life intended for them by Nature. No tooth of the first set should be prematurely removed, for the room thus produced, which should really be occupied by its successor in the second set, will be encroached upon by its neighbours. Premature removal as for example, of the 2nd temporary molar, will cause the 1st permanent molar to move forwards and take up the room normally intended for the 2nd premolar. So also will the removal before time of the Canines cause the irregularities of the 1st premolar and lateral incisors.

2. **Late removal of teeth:**—Tardiness in the removal of a temporary tooth which persists beyond its time, is as much a fruitful cause of the irregularities as premature removal. The temporary tooth if it does not fall out by itself at the proper time, must be extracted in right time. In this connection it is best that one should know the periods in life at which different teeth erupt, to enable one to render efficient help to the patient at the right time.

3. **Mouth-breathing:**—Mouth breathing is also a very fruitful cause of the irregularities in the upper jaw. These irregularities and the high vaulted palate, are usually associated with mouth-breathing due to some nasal obstruction, thus suggesting the possibility of a connection between the two. It is now definitely established that irregularities like the *Superior-protrusion* (projection forwards of the upper

front teeth) and high narrow vaulted palates that are usually associated with this irregularity, are entirely due to the obstruction in or at the back of the nasal passage. This obstruction is mostly in the form of certain growths called *Adenoids* which are found in the back of the nose. Apart from causing the dental and bony deformity in the mouths, these growths have certain far-reaching effects on the general constitution of the body. The human frame becomes so wrecked by these growths that it is readily affected by any other disease. One would not wonder at such a result when one will appreciate the fact that the body is deprived of a good part of the air, one of the three elements essential for its good development. Medical men may rightly be advised to remove these growths as soon as they are recognised. The earlier they are removed, and so the nasal passage opened out, the better it will be for the patients. It is often argued that as the *Adenoids* disappear at maturity they need not be removed. Yes, it is true that they disappear, but before they disappear they leave their evil effects behind them, and they are :

- A. The habit of mouth breathing, which means that the air which must be heated to body temperature and filtered before it reaches the lungs, reaches there quite cold, thus exposing the lungs to respiratory diseases.
- B. Infantile nasal cavities.
- C. A High vaulted palate, which means insufficient room for all the teeth.
- D. Protrusion of the front teeth, which means the marring of the features.
- E. Unhealthy condition of the gums and teeth with their consequent evil effects on all the systems of the body.



F. Adenoid looks *i. e.* idiotic looks.

G. Dull mentality as of idiots.

H. Chronic troubles of the ear.

In face of these evil effects caused by Adenoids, it would be silly to argue against their early removal.

4. **Supernumerary teeth:**—Supernumerary teeth *i. e.* teeth in excess of the usual number, are sometimes the cause of the irregularities in the arrangement of the teeth. They must be removed as soon as they are recognised.

5. **Habits:**—The habits of sucking the *Comforter*, the thumb, the lip and the tongue cause the irregularity in the front teeth.

6. **The Frenum of the lip:**—The Frenum of the lip, when attached to the periosteum of the jaw on the inside, instead of on the outside as is usually the case, causes the irregularity of the front teeth. In this case the Central-incisors are separated from each other.

Treatment.

1. Preventive.
2. Remedial.

Preventive treatment.

To prevent these irregularities coming in, the child's mouth should be periodically examined during the whole period of dentition. The deciduous teeth decayed or healthy should be removed in right time to facilitate the eruption of their successors in their proper places. Premature removal of the deciduous teeth should be avoided, for then the room

thus produced will be encroached upon by the adjacent temporary teeth, thus ousting the legitimate future permanent tooth from the place really belonging to it. To avoid this premature loss, any decay in them should be treated at an early stage, and cavities filled up as in the permanent teeth. Special care should be taken of the 1st permanent molar for its premature loss by decay, is one of the most fruitful causes of the irregularities of the permanent teeth. In deciding upon the line of treatment, sex and age of the patient, the question of heredity, general health, and contour of the face of the patient, have to be considered.

Sex:—The correction of irregularities is more essential in girls than in boys, for they mar the features.

Age:—The sooner the treatment is undertaken, the better it is accomplished. The line of treatment will also depend upon the age of the patient. The slow mechanical treatment should be avoided in young adults *i.e.* after the age of 12, for the appliances used in this treatment are likely to set up periodontal inflammation.

Heredity:—Hereditary irregularities are best left alone, for they are not very amenable to treatment. Besides they are also likely to recur.

Temperament:—In subjects of nervous temperament and weak constitution, it is best to do the immediate or surgical regulation.

Remedial treatment.

It can be carried out on two lines.

(a) Mechanical or slow treatment by means of mechanical appliances.

(b) Immediate or Surgical treatment.

Mechanical treatment.

It consists of the application of mechanical appliance, to move the misplaced tooth or teeth in their proper place in the arch. The dental profession is divided in opinion on this line of treatment. Some dentists believe that all deformities can be rectified by means of these appliances. Against them there are some who believe that these appliances by themselves are not enough to rectify the trouble. They base their opinion on the ground of the want of room in the jaw for these misplaced teeth. Their treatment consists in creating some room for these teeth in the jaw prior to the application of the appliances. It is often found in practice that the making of the room only is enough, and the rest *i.e.* moving of the teeth in place, is accomplished by Nature. The second line of treatment seems to be more rational, since want of room is the most potent cause of all these deformities. The room is made by judicious extractions of some group of teeth. Choice of groups vary according to the deformities to be rectified. While extracting some teeth, for making the room some points have to be remembered, for extractions of any and every tooth at random will not produce the required room. Those points are :

1. Extract such teeth as would unlock the bite, for otherwise no room will be produced.
2. When removing the teeth, corresponding teeth in both the jaws, should be selected for removal. The Removal of such teeth only will unlock the bite and so produce the required room; and will interfere far less with the masticating power, than any other procedure.
3. When the extraction of a particular tooth is decided upon the corresponding tooth on the opposite side must also be extracted. This will not disturb the median line.

Mechanical appliances.

They are made to suit the case in hand. They work by one slow and continuous process of absorption of bone by mild rarefying osteitis, and regeneration of bone. Absorption of bone takes place in the part in which the tooth is to be moved; and regeneration takes place behind the tooth in the part just vacated by it. Rectification of irregularities by these appliances is a long process covering a period of 3-6 months. Action by the appliance must be very gentle but constant, otherwise it will cause severe inflammation of the Periodontal membrane and consequent looseness and falling out of the tooth.

Immediate or Surgical treatment.

It consists of surgically moving the tooth in one sitting to its desired place, and retaining it in that new position by means of a splint or any other retaining device. As in all other operations, proper asepsis must be observed. Success of this operation will depend on the proper and rigid fixation of the tooth in its new position.

CHAPTER VII.

INJURIES OF THE TEETH.

1.—Concussion.

It may be caused by a slight blow, direct or indirect *i. e.* jumping on the hills, or a blow on the chin. This injury may cause slight or severe inflammation of the surrounding tissues of the tooth (*Periodontitis*). This inflammation may spread to the tooth pulp and may cause its inflammation (*Pulpitis*) and even its death. When the injury is severe enough to cause the rupture of the tooth-pulp and thus its immediate death, no symptoms may be produced at the time of the injury, and the event may pass off unnoticed. In these cases, after some time discolouration of the tooth-tissue appears, and ultimately the tooth becomes quite dark.

Signs and Symptoms.

When the injury is slight, the patients generally come with inflammation of the surrounding tissues (*Periodontitis*). Signs and symptoms in that case will be,

1. The tooth is tender on pressure.
2. Slow, dull, constant, gnawing pain.
3. Redness and puffiness of the gums round the injured tooth.
4. The tooth responds to, but is not painful to thermal stimuli.

When the injury is severe and the tooth pulp is involved in the inflammation, the patient complains of sharp, shooting

pain, instead of the slow dull pain of Periodontitis. This pain is often reflected to other teeth and adjacent tissues on the same side of the mouth, either in the same jaw or even in the other jaw. Application of heat and cold to the tooth will cause severe pain.

When pulpitis is severe enough to kill the pulp and suppuration supervenes, the tooth no longer responds to thermal stimuli; and there is the throbbing pain of suppuration, instead of the sharp lancinating pain of the inflammation of the pulp (pulpitis). The tooth is also very tender to touch, because of the severe periodontal inflammation due to the suppuration.

Treatment.

It will vary according to the nature of the damage *i.e.* whether or not the pulp is involved. When there is periodontitis only, not involving the pulp, the treatment will consist of hot water fomentations in the mouth, with application of counter-irritation to the gums round the affected tooth. For application as a counterirritant the following prescription can be strongly recommended.

R.

Tinc. Iodine ʒi

Tinc. Aconite ʒi

Spirit Camphor ʒi

Prepare liniment.

In case of periodontitis, with the pulp involved (pulpitis) the same treatment may do. But if the symptoms do not yield to treatment within two or three days time, medical

men may be advised to refer the case to the dentist, for further prolonged efforts at saving that pulp will set up very severe and often incurable periodontitis, which may need the removal of the tooth. While dentists can by proper treatment save the tooth. His treatment consists of killing and removal of the pulp, and then filling the root canals and cavity in the body of the tooth.

2. Dislocation.

It is the accidental displacement of the tooth, as a result of severe injury. It may be

1. *Partial i. e.* the tooth may get loose but still stand in the socket.

2. *Complete i. e.* the tooth is entirely thrown out of its socket.

Treatment.

In partial cases it consists of properly replacing the tooth in its right place, moulding of the adjacent tissues, and fixing of the tooth with the adjacent teeth by means of a ligature or a splint. The tooth must be rigidly fixed, or else it will not take root again. Hot fomentations and counter-irritants to the gums must also be prescribed to allay the inflammation and pain.

In case of complete dislocation, if the patient is young and is seen immediately after the accident, the tooth should at once be placed in its proper position, and rigidly fixed there by means of a splint. If so promptly treated, union of the ruptured structures may take place. But if the patient is an adult, and is seen after a few hours of the accident, the root-canal must be cleared of the pulp, sterilised, and filled

up before the tooth is placed back and fixed up in its place. Great attention must be paid to proper splinting, for on proper and rigid fixation will depend the success of the operation.

Unerupted teeth are also sometimes partially or completely dislocated. Such an accident is possible in the case of Premolars. They are sometimes completely dislocated during the extraction of temporary Molars, between the roots of which they lie when waiting to be erupted. In case of such accident the tooth must be replaced in its crypt and adjacent parts properly moulded over it. In all cases of dislocation proper asepsis must be observed, and steps must be taken to relieve the pain and inflammation.

3. Fracture.

The upper front teeth, by the virtue their exposed position, are more liable to this accident, than any other teeth. Fractures may be

1. Partial and involving the enamel only.
2. Partial and involving the enamel and dentine, but not extending to the pulp.
3. Complete or transverse and involving also the pulp.

Signs and Symptoms.

There are none when only the enamel is involved. When the dentine is also involved, the symptoms are

1. Hypersensitiveness in the dentine exposed.
2. Extreme pain with heat or cold, indicating the congestion of the underlying tooth-pulp.

3. Tenderness of the tooth to touch, showing the congestion also of the periodontal membrane.

In case of transverse fractures, these symptoms may or may not be present, and the accident, bar slight tenderness of the tooth on touch and the disfigurement caused by the broken tooth, may pass unnoticed.

Treatment.

When only the enamel is involved, no treatment is required beyond the smoothing down of its rugged edges. When the dentine is also involved and there are signs and symptoms of the hyperæmia of the pulp and the periodontal membrane, the treatment consists of the application of hot fomentations and counter-irritants to the gums round the injured tooth, and application of obtundants such as Silver-nitrate and Zinc-chloride to the exposed and sensitive dentine. When all the symptoms disappear, the tooth must be trimmed to minimise the disfigurement. Treatment in case of transverse fractures, is almost purely dental treatment, and the medical men may be advised not to trifle with the case beyond rendering immediate help to relieve symptoms of inflammation and pain; and to refer the patient to the dental-surgeon as early as possible. However it is important for them to know certain points on which the treatment will depend. These points are

1. The age of the patient, in order to determine if the root of the injured tooth is completed.

The root of the Central-incisor is completed at the age of 10 years, and that of the Lateral-incisor at the age of ten and a half years. On the knowledge of the age of completion of these roots will rest the decision of immediate

removal of the tooth, or its retention by careful treatment, with an idea of future crowning. In case of fracture in subjects below the age of 10 years, the prospects of future crowning being very unfavourable, the tooth may be safely removed.

In case of the patient above the age of ten years, the case must be immediately referred to the dental surgeon for proper treatment with an eye to subsequent crowning at a later date.

2. The sex of the patient.

Removal of the injured tooth is of less importance to a boy than to a girl. In girls care must be taken for its retention for future crowning, for its removal may mar their features.

3. Crowding of the teeth in the mouth.

In cases of the fracture of a tooth, in a crowded mouth *i. e.* where there is irregularity of the teeth, the tooth may be immediately extracted, for almost always the gap, caused by the extraction, will be closed up.

In cases of transverse or oblique fractures right up the roots, attempts may be made to allow the natural healing and union of the fractured ends. But failing such union within reasonable time the tooth is best extracted. Fractures of the lower teeth will be best treated by extraction.

CHAPTER IX.

CALCULUS or TARTAR

Tartar is the deposit on the teeth, composed of various salts from the Saliva, organic matter, pus and epithelial cells, mucin, food stuffs, and micro-organisms.

Varieties.

There are two varieties of tartar.

1. Salivary Calculus.
2. Serumal calculus.

Salivary Calculus.

It is mostly formed on the lingual aspects of the lower front teeth, and the buccal surface of the upper molars, *i.e.* in close proximity of the openings of the two main salivary ducts. It is hard, dark in colour, and tenaciously adherent to the surface of the teeth, when it is slowly formed; and is soft, yellow in colour, and formed in big quantities when it is rapidly deposited. It starts at the cervical margin, and grows by fresh deposition of salivary salts. It grows downwards pushing away the gum by its progress under and over the gum in the form of a ledge. This ledge allows of collections underneath, of micro-organisms and food stuffs, which putrefying cause the evil consequences of the deposition of tartar. These are

1. Chronic inflammation and absorption of the gum.
2. Chronic inflammation and absorption of the periodontal membrane.

3. **Chronic inflammation and absorption of the bone of the alveolus, resulting in the loosening and falling out of the teeth.**

The deposition of tartar can be retarded, but by no means prevented by cleanliness and brushing of the teeth. It mostly forms on the unused teeth. The deposit on the molars is usually harder than that formed on the lower incisors.

Cause of deposition.

It is not definitely known, but is generally supposed to be due to the escape of Carbonic acid gas contained in the saliva, which is responsible for holding the salts in solution. This theory receives its support from the fact that there is always an abundant quantity of tartar formed in the mouths of mouth-breathers, where there is copious escape of this gas.

Serumal calculus.

Serumal calculus, otherwise called Sub-gingival tartar on account of its usual formation much under the free margin of the gum. The source of this variety is supposed to be the blood serum and not the saliva. *This deposit is very often the cause of abscesses under the teeth that are seemingly healthy, and have live pulp in them.*

Treatment.

This consists of a thorough removal of the deposit and subsequent polishing of the surfaces of the teeth. The removal must be as complete as possible, for every bit left will act as an irritant and a nidus for further deposition.

There exists a wrong impression among the lay people and even among the medical men, that this operation of Scaling (removal of tartar) loosens the teeth. Such is not the case. It is true that very often the teeth are found to be loose after the tartar is removed, but that looseness is due to the tartar itself, and not to the operation of Scaling. This operation only makes the looseness manifest itself. Even granting that this operation loosens the teeth, medical men may be advised to recommend this operation, for clean though slightly loose teeth are better than seemingly firm but dirty teeth, covered with abundance of tartar, harbouring accumulations of germs and putrefying food stuffs under it. For the after-treatment to follow the operation of Scaling either of the following prescriptions may be advantageously used.

R.

| | | | | | |
|-----------------|-----|-----|-----|-----|--------|
| Tinc Myrrh | ... | ... | ... | ... | ℥ i |
| Thymol | ... | ... | ... | ... | gr. i |
| Aqua chloroform | ... | ... | ... | ... | oz. iv |

To be rubbed in the gum with a brush.

Prepare solution.

R.

| | | | | | |
|--------------------|-----|-----|-----|-----|-----|
| Tinc Iodine | ... | ... | ... | ... | ℥ i |
| Tinc Aconite | ... | ... | ... | ... | ℥ i |
| Spirits of Camphor | ... | ... | ... | ... | ℥ i |

Prepare liniment.

To be applied to the gums after hot gargles.

CHAPTER X.

THE BACTERIOLOGY OF THE MOUTH.

The mouth cavity even in the healthiest condition is a good incubator for all sorts of germs. In it are found all the conditions viz., the temperature, moisture, medium &c. that are needed by the germs for their development. Naturally all sorts of bacteria, Non-pathogenic that are peculiar to this cavity, and Pathogenic *i. e.* disease producing germs, exist in large numbers in the mouth-cavity. These bacteria are greater in number and more virulent in action in unclean mouths than in clean ones. The Pathogenic organisms found in the mouth are

1. Staphilococi.
2. Pneumococi.
3. Klebs-Loeffler or Diphtheria bacilli.
4. Tubercle bacilli.
5. Oidium or Saccharomyces albicans or Thrush fungus.
6. Actinomyces or Ray fungus.

The non-pathogenic organisms found in the mouth are

1. Streptococcus hrevis
2. Micrococcus tetragenous.
3. Leptothrix buccalis.
4. Spirochæte dentium &c.



Of these the *Streptococcus brevis* is the most constant, and is found in healthy as well as unhealthy mouths. What function these non-pathogenic organisms perform, is not definitely known.

It is interesting to note the comparative immunity of the system, against the attack of the pathogenic organisms that are mostly found in healthy or unhealthy mouths. The two reasons for it are

1. The bactericidal action of the Saliva.
2. The resisting power of the body due to the Anti-toxic property of the blood.

Bacteriology of Caries.

On entering this subject one interesting fact that strikes one is that Caries (decay of the tooth) which is in a way a process of putrefaction, sometimes occurs in abundance in clean healthy mouths, while it is conspicuously absent in uncared for and dirty mouths. The organisms concerned in this process are of two kinds.

1. Acid-producers. They are Anaerobic (capable of thriving without oxygen) e. g. *Streptococcus brevis*, *Bacillus necrodentalis*, *Stephylococcus albus* and *aureus*, and *Sarcina albus*.
2. Liquifiers (of dentine). They are Aerobic (requiring oxygen for their growth) e.g. *Bacillus mesentericus ruber* *Bacillus gingivæ pyogenes* &c.

Process of Caries.

Caries is a chemico-parasitical process consisting of two parts.

1. Acid formation and softening of the tooth substance by means of these acids.

2. Liquifaction and digestion of the softened tooth-tissues.

For the working of this process two things are absolutely necessary viz. the bacteria, and such suitable food stuffs (carbohydrates) which can be decomposed into acids by the action of these bacteria. The process of caries can in short be described as follows:—

"The acid producing bacteria work upon the carbohydrate food stuffs and produce acids (chiefly Lactic acid), which in turn act upon the enamel of the teeth, and soften it by dissolving out the calcarious salts. The enamel mainly consisting of calcarious salts absolutely crumbles away under the action of acids, thus exposing the underlying dentine to their action. Acids working on the dentine, soften it by dissolving out the salts. The chondrogenous matrix thus made soft, is gradually liquified and digested by the Liquifiers *i.e.* the germs capable of digesting the softened dentine. Thus gradually the tooth-substance is eaten away by the process of caries and the cavity in the tooth is formed. By further softening and digestion of the dentine the cavity gets bigger and bigger till it reaches the tooth-pulp and kills it. The pulp after a time gets infected by the germs in the cavity and the mouth, and putrefies. The products of this putrefaction may pass through the apex of the tooth into the bone and form an abscess."

Of what happens to these bacteria, of the mouth very little is known beyond the fact that most of them are spitted or washed out. Some pass into the alimentary canal, and those that are not killed and digested by the Gastric juice,

CHAPTER XI

CARIES

HISTORY

Caries or decay of the tooth is more or less a disease of civilisation. Though it existed among the ancients, for there are traces of this disease found in ancient skulls, and mention has been made in ancient Hindu Medicine, of fillings with gold and silver, presumably for the decay of teeth; yet its prevalence at that distant age was nothing compared to that at the present day. That it is a disease of civilisation is proved by the fact that even the present day primitive races are free from it, compared to the modern civilised races. It is further shown by the alarming extent of the prevalence of this disease among the American and European school children, 75—95 p.c of whom are found to be suffering from caries.

To what extent this disease is prevalent in India could not be ascertained for there are no records available owing to the backward state of dentistry here. From what little information I have collected from personal dental inspections in some of the Bombay schools, and from the experience of other examiners, I put down the extent of this disease among Indian children to between 30-55 p. c.

Susceptibility and Immunity of individual tooth

Caries is more prevalent in the first molars than in any other tooth; and it is more so in the lower molars than in the upper. This is not due to any inherent structural defect in them, but due to its infection from the unhealthy

condition usually existing in the mouth, at the tender age (6th year) when these teeth erupt. Another reason is that this most important tooth of the permanent set is mistaken to be a member of the first or temporary set, and so neglected along with the others of that set, for there is that notion in the lay mind that as these teeth are temporary and are to fall out, they can be safely neglected; and that, decay, they think is in fact Nature's process for their removal from the mouth. The unhealthy condition at that early age is due to the ignorance of the public, of the ordinary principles of oral hygiene, and of the importance of the healthy mouth, and of a good first set of teeth, for the welfare of the body. It is said that in over 80 p. c. of children these first molar teeth if not already lost by extraction, are hopelessly and unsavably decayed before they reach the age of 12 years. The teeth that are generally free from caries, are the Lower-incisor teeth. It is because they are scrubbed clean by the free movement of the tongue and the lip. Caries is more frequent in females than in males; and is more prevalent during the period of adolescence than in the adult age.

Process of caries.

The commencement of the process of caries makes itself manifest by the loss of polish and translucency of the enamel over the affected spot. As it advances, a white spot appears at the affected place, and then after sometime a cavity appears on the spot owing to the washing away of the softened enamel substance. Progressing still further it attacks the dentine, which first softens under the action of the acids, and then undergoes disintegration and liquifaction by the action of the Liquifiers (bacteria capable of digesting the softened dentine), leaving a large cavity in the tooth. In well formed teeth the cavity takes the form of a cone

with the apex towards the pulp. In teeth of defective structure the cavity generally extends horizontally and becomes saucer-shaped. When the process of caries is slow there is more marked discolouration of the tooth-tissue than when the process is rapid.

Arrested caries.

Sometimes the process of caries gets spontaneously arrested. Why and how it happens is not definitely known, but it is generally believed to be due to the general improvement in the health of the individual, for there is almost always such marked improvement of general health in these cases. This condition is generally found in the first molars. Under this circumstance the exposed dentine is quite black and hard. The process of the arrest of caries is identical to that taking place during the healing of a pulmonary cavity in Tuberculosis of the lung.

Etiology of Caries.

There are several theories propounded by different investigators. They are

1. Chemico-parasitic.
2. Inflammatory.
3. Electrical.
4. Chemical.

Of these the first that "Caries is a chemico-parasitic process" as described on p. 51 is the best and most accepted by the dental profession.

Predisposing causes.

- | | | |
|-------------|---|---------------------------|
| 1. Local | { | Connected with the mouth. |
| | | External. |
| 2. General. | | |

Local.

The formation of the teeth has much to do with the occurrence of caries. Teeth with weak structure are more prone to caries than well formed teeth. A normal arrangement of the teeth and the gums in Nature is a great safeguard against caries. This arrangement is that "all the teeth come in contact with each other by one single point, forming the V-shaped spaces in between them; and which are filled up by the gum tissue." This arrangement will enable Nature's cleansers (the tongue and lips) and the artificial means such as brush and tooth-pick to keep the teeth clean. But any condition (e.g. abnormally placed teeth or loose and receded gums) which alters this natural arrangement, will tend, by creating spaces facilitating lodgement of food-stuffs and micro-organisms, to promote the development of caries.

External causes.

Constitutional troubles.

The acid and mucoid condition of the saliva due to Dyspepsia, febrile conditions and Pregnancy, is a potent cause of caries. The acid condition works as a direct cause, while the other works indirectly by sticking on to the teeth and so helping the food-particles to stick on them.

Food.

Such food as has the tendency to lodge on teeth-surfaces and to undergo fermentation is the kind that best promotes the inception of caries. Hence the carbohydrate food is more likely to cause caries than the proteid or meat diet. It is said that meat-eating individuals are more free from caries than those whose staple food is carbohydrates. But

the experience of practitioners in India is otherwise. It is a common experience that Indians who practically live on carbohydrates are infinitely more free from caries than any meat eating European nation.

General.

1. Heredity.

Heredity does play some part in the causation of caries. Its action can be considerably neutralised if proper attention is paid to the food and the habit of cleansing of the mouth of the individual.

2. Pregnancy.

Some women show marked tendency to caries of the teeth during this period. This may be due to the acid condition of the saliva or to the vomiting attacks during this period. This predisposition during this period is not constant, for there are instances of mothers of many children possessing good teeth and showing no such predisposition at all. It is believed that this predisposition to caries has its origin in the beliefs amongst mothers that

- (a) It is natural for a mother to suffer dental troubles during this period.
- (b) That she must let her teeth and mouth severely alone during this period, lest any effort at cleansing on her part would hurt or disfigure the foetus.

If only mothers can be made to keep their mouths clean during this period, this factor would cease to be a cause of caries. It would be in the interest of both the

ed by these uncivilised people, thoroughly scrubs the teeth clean during the action of mastication. The teeth are also scrubbed clean by the strong movements of the muscles of the tongue and lips, and the coarse fibrous matter contained in the food-stuff.

Chemico-physiological.

This process is brought about by the antiseptic property of the saliva, and its amylolatic action on certain parts of the food-stuffs.

Hydro-dynamical.

This process operates by the parts of the mouth being continually washed by the constant flow of the saliva, and by its being forcibly pumped through the crevices between the teeth, by the muscles of the tongue and lips.

Bacterial.

This process operates through certain bacteria, whose presence is beneficial to the health of the mouth cavity.

So, taking Nature as our guide, our preventive treatment must consist of

1. The adoption of firm, fibrous food stuffs that would scrub the teeth clean and call forth the play of the muscles of mastication.

2. Encouraging the flow of the saliva, in order to wash clean the interspaces between the teeth, and to exercise its

antiseptic action. This can be best done by introducing natural organic acids, such as are found in fruits, in our meals, especially as a final course.

This line of preventive treatment if scrupulously followed, would suffice; but very often it is found that some artificial means at prevention may be needed in addition to these.

Artificial means of prevention.

As caries is a chemico-parasitical process, naturally something counteracting the chemical and parasitic processes, must form the key-note of the preventive treatment. So the treatment must consist of antiseptics to counteract the effects of parasites, and antacids to counteract the effects of acids that result from the chemical action.

Antacid mouth wash.

R/.

| | | | | |
|-----------|-----|-----|-----|-------|
| Mag Carh | ... | ... | ... | 3 iv |
| Aqua Rosæ | ... | ... | ... | oz iv |

Prepare mixture.

One teaspoonful to be kept and sluiced about in the mouth, morning and night. Shake before using.

Tooth-powder.

R/.

| | | | | |
|----------------|-----|-----|-----|---------|
| Crete Præcip | ... | ... | ... | oz I |
| Pulvis. Iridis | ... | ... | ... | gr. xxx |
| Oil of Cloves | ... | ... | ... | m xx |
| Otto Rosæ | ... | ... | ... | m iii |

Prepare Powder.

Antiseptic mouth wash.

R/.

| | |
|-------------------|----------------|
| Hydrogen Peroxide | } Equal parts. |
| Aqua. | |

These prescriptions are suggested but are by no means necessary. Patients may be better advised to depend upon their own manual efforts by means of a hard brush, a fairly gritty powder, and pure water, for the prevention of caries.

Remedial treatment.

① It is a purely dental treatment, and consists of the removal of the decayed portion, the sterilisation of the adjacent healthy tooth tissue, and the filling up of the cavity with suitable filling materials. ② When caries is extensive and the crown of the tooth is destroyed, the tooth can be contoured up by means of an artificial crown. The remedial treatment in the reach of the medical practitioners is the use of drugs such as Silver nitrate and Absolute alcohol, in cases of slight caries in adults or the extensive superficial caries in children. This treatment must consist of the application of the saturated solution or pure sticks of Silver nitrate twice or thrice at intervals of a week, and the application of Absolute alcohol once a day during the intervals. During the application of these drugs, saliva must be kept away from the parts treated. These drugs act by precipitating the protoplasm in the dental tubes. Beyond this treatment a medical man may do the radical treatment *c. g.* the extraction of the tooth. But he would be better advised to stop short at palliative treatment, and leave the legitimate dental treatment to a properly qualified dental surgeon.

CHAPTER XII

DIETETICS

Human food consists of **Proteids** or Nitrogenous food-stuffs, **Fats** and **Carbohydrates**. Of these the Carbohydrate class is the most important from the point of view of the etiology of caries, for the reaction of the products of the action of the Saliva on this stuff is acid. Of the three varieties (sugar, starch and cellulose) of carbohydrates, sugar is the most injurious to the teeth for when acted upon by the saliva and the micro-organisms of the mouth, it produces acids, which are responsible for the process of caries. Not only that it lodges in between the teeth, but it helps other food-stuffs to lodge there and to undergo acid production. Starch though distinctly harmful is less so than sugar. Hence the diet consisting of biscuits, soft bread, porridge, cakes &c. is decidedly harmful to the teeth, especially when they form the last part of one's meal as is usually the case with fashionable dinners. Cellulose is the least harmful of all the carbohydrates, for it is least acted upon by the saliva, and it does not stick to the teeth. In fact it exerts a beneficial effect upon the teeth, for by calling forth the mechanism of mastication, it exercises the detergent or cleaning action on the teeth. Hence the fibrous and acid food-stuffs such as vegetables and fruits are beneficial to the teeth, especially when they form the last part of one's meal. Acid-foods such as fruits prevent the activity of the acid-producing bacteria of the mouth. Hence, fruits, taken as the last part of the meals, are a great preventive against caries. Meat or proteid diet is beneficial to the teeth for by virtue of its fibrous element it scrubs the teeth clean, and when acted upon by the saliva it produces alkalies and not acids.

The action of fats on the teeth is quite negligible, for it undergoes no change in the mouth.

From this short discussion of the diets and their influence on the welfare of the teeth and the mouth, one point stands clear, and that is "fruits must form the last part of the meal."

Infant diet.

Mother's milk is the best possible diet for the infant, for

1. Breast feeding helps the muscles of mastication, and the jaws to develop well.
2. It contains all the materials that a growing body needs for its development.
3. It protects the body against the infection that the child is liable to catch from bottle-feeding.

That mother's milk is the best diet, is amply verified by the fact that the mouths of Asiatic and Indian children are healthier than those of the children of the so called civilised and superior European nations. This is because there is more breast-feeding amongst the former than the latter. It is in the interest of the child that whenever possible, it must always be brought up on breast-feeding.

But where the mother's milk is not available, cow's or buffalo's milk duly diluted may be substituted; though the substitution of any other milk, and all means to secure a perfect substitute, are a hopeless pursuit of the unattainable. Although apparently good results may be obtained in many cases, yet compared with the results from mother's milk

they are miserable failures; and an inexorable law is operating which leads to a proportionately greater extermination of the bottle-fed, and thus concomitantly to the extermination of prospective mothers born from those who have not fulfilled their maternal functions.

As the child grows up, and the first tooth appears in the mouth, a judicious change, from the entirely liquid diet, to the mixed milk and solid diet, must be made. The solid diet must be of the nature that can be sucked or gnawed *e.g.* crust of bread, rolls, or toast and butter. It must be given in that form and not soaked in milk or soup, as is usually done by mothers; for in that case the deciduous teeth are deprived of their usual work assigned to them by Nature; and besides, that softened food would stick to the teeth and so cause their decay. This tendency to decay is most apparent when such soft food is persevered with after the eruption of the molar teeth. These teeth suffer most from caries, as a result of this soft food sticking in the crevices between the cusps.

Besides this, what happens when solids are given soaked in milk, is that the infant gulps it down without retaining it in the mouth and therefore without mixing it with the saliva. The starchy matter is therefore washed into the stomach without any conversion. *i. e.* without any preparation for its digestion in the stomach.

By becoming accustomed to swallowing solid food, the child soon loses that automatic mechanism which arrests the solid food in the mouth till it is turned liquid. Under such circumstances, the child often coughs, chokes, and splutters when being fed. Seeing this, mothers think that it is because of the solids in the diet, and are further inclined to pulverise, mince and soak every particle of food before

giving it to the child. Unfortunately this pulverising, mincing and soaking of the food in milk is not forbidden, nay, on the contrary is advocated and encouraged by the medical profession.

Hence it will be seen that the usual diet of a good class child of about one year, consisting of milk, porridge, custards, milk-puddings, cakes, and sweets, make an entirely wrong diet. It is not conducive to the health of the teeth and the mouth, for it contains nothing that will call forth any effort of mastication, which is essential for the welfare of the mouth cavity. Mothers feed their children on such pappy food for they have a notion that hard solid food hurts the baby's tender teeth and digestion. They must be taught that by giving such food they are doing the very mischief that they are trying to avoid. Indicious infant feeding must consist of three meals of sufficient quantity, and containing hard substances like crust of bread, or toast; and having fruits like orange, apple etc. to wind them up.

CHAPTER XIII

CAUSES, OTHER THAN CARIES, OF THE DESTRUCTION OF TEETH.

Erosion.

It is the condition in which one or more teeth are affected. In this condition, smooth, clean, and polished cavities occur on the labial surfaces of the teeth near the gum margin. The cause of this trouble is not definitely known; but clinical investigations in the matter have established the connection of this trouble with Rheumatic and Gouty diathesis. The condition starts in the enamel at the necks of the teeth, then progressing iowards, affects the dentine, which becomes very sensitive to the touch, or to acid and sweet food-stuffs. When slow in progress, the conditioo, (barring the sensitiveness of the dentine) is almost painless, because of the fresh deposition of dentine (Adventitious dentine) caused by the activity of the peripheral cells (Odontoblasts) of the pulp. If the process is rapid and the destruction outstrips the formation of the protective dentine, the conditioo is very painful because of the severe irritation, or the actual exposure of the tooth-pulp.

Treatment.

If the condition is extensive, and with decided gouty or rheumatic diathesis, it must be constitutionally treated. If only a few teeth are affected, the cavities must be touched with Silver-nitrate, which will help to allay pain, and retard if not quite prevent the progress of the condition. As there is considerable acidity of the saliva in this condition, the use of milk of magnesia may be strongly recommended.

will retard the progress of the condition and alleviate the sensitiveness of the dentine. The following paint may also be prescribed,

R.

| | | | | |
|---------------|-----|-----|-----|-------------------|
| Gum mastic | ... | ... | ... | 3 i |
| Zinc Chloride | ... | ... | ... | m v |
| Chloroform | ... | ... | ... | oz. $\frac{1}{2}$ |

Prepare paint.

To be applied to the tooth after drying it.

Attrition.

It is the destruction of the tooth-substance due to the grinding of the opposing surfaces. This condition is generally met with in adults with a Rheumatic or Gouty diathesis and in those who are used to eating coarse food. When very rapid in progress, it is attended with considerable pain due to the sensitive dentine or the exposure of the pulp, but when slow it is practically painless, because of the formation of adventitious or protective dentine. In extreme cases the crowns of the teeth are ground down to the level of the gum.

Treatment.

The only treatment a medical man can give is to allay the hyper-sensitiveness of the dentine, by the means described on page 67. Beyond this the treatment is purely dental, and consists of relieving the heavy bite by means of artificial crowns or dentures.

Abrasion.

It is the destruction of the tooth-substance due to friction from a foreign body such as the clasp of a denture or a tooth-brush. It generally occurs in subjects of Rheumatic or Gouty diathesis. The abrasion cavities are more often found on the outside of the left Canines and Premolars than the right ones. This is because of the greater friction of the brush on the left side than on the right. The cavity is sensitive to the touch, and to acid or sweet food-stuffs.

Treatment.

Avoid the cause of the friction. Treat the hyper-sensitiveness of the dentine by means described on page 67.

CHAPTER XIV.

INJURIES AND DISEASES OF THE DENTAL PULP.

RUPTURE OF THE PULP.

This injury occurs in the accidental dislocation of the tooth. If the tooth is replaced in time, the regeneration and union of the detached portions of the pulp generally take place. To facilitate such union the following precautions must be taken.

1. Proper asepsis must be observed.

2. The tooth must be rigidly fixed.

3. Hot fomentations and counter-irritation to the gums must be prescribed to relieve the inflammation due to the injury.

Hyperæmia or Congestion of the pulp.

Causes.

1. Thermal stimulus.

2. Irritation by Caries.

3. Irritants like acid or sweet food-stuffs, when there is cavity in the tooth.

4. Injury.

Symptoms.

1. Slight pain on thermal changes *i.e.* on taking hot or cold fluids.

2. Tooth tender to the touch. This is the case only when the condition is severe and the periodontal membrane is involved in the congestion.

Treatment.

Application of a sedative like the Oil of Cloves or Carbolic acid to the exposed dentine or the pulp, and fomentations and counter-irritants to the gum surrounding the injured tooth are generally about all the treatment that a medical man can immediately give to allay the pain and congestion, before referring the patient to a dental surgeon for the further treatment of preparing and filling up the cavity in the tooth. If the condition does not yield to this treatment, the pulp must be devitalised and removed before the root-canals and the cavity are filled up. When the condition is very acute, and there is no cavity in the tooth, and the patient is exhausted from severe pain, the tooth may be safely extracted.

Pulpitis.

(Inflammation of the pulp).

Varieties.

A. Acute.

B. Chronic.

Acute pulpitis.

Causes.

1. Hypercæmia of the pulp.
2. Caries.

3. Infection from the periodontal membrane.
4. Laceration due to cavity-preparation by the dentist.

Symptoms.

1. Sharp, shooting, throbbing pain.
2. Pain intermittent.
3. Pain severer at night. This is due to the horizontal posture of the patient, and to the cooler temperature at night.
4. Severe paroxysms of pain due to thermal changes.
5. Relief of pain by cold in the very early stages of the inflammation.

Treatment.

Medical men may be advised to temporarily allay the pain by the application of drugs like pure Carbolic acid, Creosote, Oil of Cloves, Tinc. Opi, Alcohol, Rectified spirit &c. Gargling with brandy or whisky in water, is one of the most popular remedies for severe tooth-ache. All the so called tooth-ache cures on the market, are nothing but pure Carbolic acid. Beyond the temporary relief of pain, the rest of the treatment is purely dental, and consists of devitalisation and extraction of the pulp, and the filling up of the root-canals and the cavity in the tooth.

Chronic Pulpitis.

Varieties.

- (a) Suppurative.
- (b) Productive.
- (c) Degenerative.

Suppurative pulpitis.

1. Pain may or may not be present.
2. Pain by thermal changes in the early beginning.
3. Relief of pain by cold in later stages.
4. Severe paroxysm of pain by heat in later stages.
This symptom is almost diagnostic of the suppuration of the pulp.
5. Pain severer at night than during the day, because of the horizontal position of the patient at night.
6. Pain very constant and throbbing.
7. Tooth tender to the touch if the periodontal membrane is involved.
8. Almost instantaneous relief of pain on the opening of the pulp-chamber.

Treatment.

Medical men may be advised to prescribe an antiseptic mouth-wash like Hydrogen-peroxide, and counter-irritants to the gum round the tooth, and immediately to refer the case to the dentist. His treatment consists of the opening out of the pulp chamber, washing and sterilising it before and after it is cleared of the putrefying debris; and then filling up of the root-canals and the cavity of the tooth.

Productive pulpitis.

In this condition there occurs a great proliferation of the granulation tissue, which often projects from the pulp-chamber into the cavity in the tooth. This mass resembles

the localised hypertrophied mass of the gum projecting in the cavity of the tooth.

The distinguishing points are:

In productive pulpitis there is (1) absence of pain on pressure (2) not much tendency to bleed. In case of the projection of the hypertrophied gum in the cavity, there is

1. Extreme pain on pressure.
2. Considerable tendency to bleed on the slightest touch.

Treatment.

It is purely dental and consists of the devitalisation and the extraction of the pulp, and filling up of the root-canals and the cavity of the tooth.

Degenerative pulpitis.

Varieties.

1. Fatty.
2. Fibroid.
3. Calcarious.

They generally occur in subjects of advanced age, and especially of gouty or rheumatic diathesis.

Treatment.

It is purely dental and is the same as in productive pulpitis.

CHAPTER XV.

DISEASES OF THE PERIODONTAL MEMBRANE.

PERIODONTITIS.

(Inflammation of the Periodontal membrane).

Varieties.

1. Acute local periodontitis.
2. Chronic local periodontitis
3. Acute general suppurative periodontitis.
4. Chronic general suppurative periodontitis (popularly called. *Pyorrhœa Alveolaris*).

1. Acute local periodontitis.

Causes.

1. Trauma.
2. Sepsis.
3. Chemical irritation.

A majority of these cases are due to the septic infection from the dead or suppurating tooth-pulp. Sometimes it may also be due to the infection through the blood-current (auto-infection) from other parts of the body. Escherotic action of drugs like Arsenic, Formaline &c. may also cause this trouble. The inflammation of the tooth-pulp (pulpitis) may extend to the periodontal membrane and cause its inflammation.

Signs and Symptoms.

1. Feeling of uneasiness in the part.
2. Inclination to press the tooth, for in the beginning the pressure relieves the pain by squeezing the blood out of the part.
3. Tenderness of the tooth.
4. Gum over the tooth swollen and painful.
5. Deep, constant, gnawing pain.
6. The tooth feels longer or higher than the others.
7. Attendant general symptoms of inflammation when the condition is severe.

The inflammation may resolve by itself or under proper treatment; or may undergo suppuration and an abscess may form. When the pus is confined inside the bone, there is severe throbbing pain; but it disappears as soon as the pus bursts through the bony walls into the soft tissues. The pus may escape at the free margin of the gums, or may escape into the soft tissues of the mouth cavity or of the cheeks and cause a swelling of the parts; or may break through them and discharge inside the mouth-cavity or outside on the face. In case of the upper Central and Lateral incisors, the pus may travel into the nasal fosa; in case of the Canines it may go to the inner canthus of the eye; and in case of the Premolars and Molars it may travel towards the antrum and may open into it. Abscesses in connection with the lower teeth may open into the floor of the mouth, on the face, and under the chin. They may even open as low down as the upper or lower border of the clavicle. This is possible when the pus opens in the space between the Platysma

myoidis and the Cervical facia. Sometimes the pus travels along the soft cellular connective tissue under the chin, producing a very grave condition called *Ludvic's Angina*. It is the inflammation (cellulitis) and œdema of the soft cellular tissues of the neck just under the mandible. This condition almost always terminates fatally, by causing the œdema of the Larynx and Glottis. The patient dies of asphæxia.

Treatment.

The first point to decide is whether or not the tooth can be saved. If it is badly decayed and so unsavable, it must be immediately removed. If the tooth is savable and the condition is slight, the treatment consists of the removal of the cause, hot antiseptic mouth-wash, and counter-irritants to the gum over the affected tooth. When suppuration occurs, the pus must be immediately let out by an incision inside the mouth. If the swelling is big and the abscess is pointing to the skin over the face, the part must be supported with cotton and collodion, and the abscess opened out by an incision inside the mouth. When the opening through the skin is unavoidable, as in the case where the mouth cannot be opened, the pus must be let out by a clear cut incision and should not be allowed to burst through and so leave an ugly scar behind. In opening the abscess in the lower jaw care must be taken to avoid injury to the Facial artery which rounds the lower border of the mandible, pursuing its course upwards into the soft tissues of the cheek. It can best be avoided by pushing the cheek right away, and keeping the cutting edge of the knife pointing towards the bone when incising. Anterior and posterior Palatine arteries are liable to be injured in the opening of the abscess in the palate. To avoid these structures cut parallel to them and a little away from the tooth.

Chronic local periodontitis.

Varieties. .

- (a) Rarefying periodontitis.
- (b) Productive periodontitis.
- (c) Suppurative periodontitis.

They are all one and the same disease, only varying in intensity. Of these the last i.e. chronic local suppurative periodontitis, popularly called **Chronic Dento-alveolar abscess or Gum-boil**, is the most frequent and important.

Causes.

- 1. Acute periodontitis, of which this may be a sequel.
- 2. Injury, such as perforation of the root, or too rapid separation of the teeth, by the dentist.
- 3. Infection from the tooth-pulp.
- 4. A misplaced tooth.
- 5. Excessive use.

Signs and Symptoms.

In the early stage

- 1. Slight pain and tenderness on pressure or percussion.
- 2. Slight congestion and swelling of the gum over the tooth.
- 3. Tooth slightly loose.

Then as the case advances

- 4. Slow, dull, continuous, gnawing pain.

5. Greater swelling and congestion of the periodontal membrane and gum over the tooth, as the condition passes into suppuration.

6. Throbbing pain of suppuration.

7. Swelling of the surrounding tissues, when the pus breaks through the bone.

8. Presence of a sinus when the pus bursts through the soft tissues outside the gum in the mouth cavity, or outside on the face.

After the pus once exudes away, the symptoms may subside, and the condition resolves itself, at least for some time, to re-appear at some later date. Then the condition may be free from pain and the patient may only complain of a gum-boil which periodically swells and bursts.

Treatment.

If the tooth is very badly decayed and is unsavable, it must be immediately removed. Soon after the removal of the tooth, the sinus if present will heal up; but if it does not it must be stimulated by 10 p. c. solution of Silver nitrate. If the tooth is savable then the treatment is purely dental, and consists of the thorough opening and cleansing of the pulp chamber and the root-canals, and the filling up of the cavity. Under proper treatment the sinus and the abscess-cavity heal up. If in spite of proper treatment the inflammation still persists, the tooth must better be removed, for the inflammation may involve the adjacent teeth.

General periodontitis.

Varieties.

(a) Acute.

(b) Chronic.

Acute.**Varieties.**

- (1) Acute general periodontitis.
- (2) Acute general suppurative periodontitis.

Acute General Periodontitis.

This is the condition in which a number of teeth, or perhaps all the teeth are involved.

Causes.

1. Irritation by tartar or badly fitting denture.
2. Overaction of the drugs such as Arsenic, Mercury, Phosphorus.
3. Exanthematous fevers.
4. Injury in persons, subject to Gout, Rheumatism and Syphilis.

Signs and Symptoms.

1. General soreness all over the mouth.
2. Gums red, congested and swollen.
3. Dull, gnawing pain.
4. Pain sometimes severe when the patient is gouty or rheumatic.

Treatment.

Local treatment consists of the removal of the cause, whether it be tartar, denture or over action of the drug

hot poppy-head fomentations with some antiseptic, and application of some counter-irritant to the gums. General treatment consists of anti-syphilitic, or gouty remedies, and thorough opening out of the bowels.

This inflammation under proper treatment may disappear or may pass into the suppurative stage.

Acute General Suppurative Periodontitis.

This variety is the severer form of Acute general periodontitis. Signs and symptoms are the same as in the other but in a more exaggerated form, with the addition of a copious exudation of pus from the sockets of the teeth. This variety is usually wrongly termed, because of the exudation of pus, *Pyorrhoea Alveolaris* by the medical profession and lay public.

Treatment.

It is the same as in general periodontitis. In these cases Hydrogen Peroxide must be used as a mouth-wash, in preference to any other drug. In subjects of syphilis Hydrarg Perchloride may be substituted for Hydrogen Peroxide. Some tonic treatment must be given, for usually the patients are considerably low in health, and bowels must be kept open. Calomel or any other Mercurial remedy must be avoided in these cases; for if they fail, as they often do in opening the bowels, they are secreted in the mouth, and make the condition much worse. Great care must also be taken in giving Mercury for Syphilis. The cause of general periodontitis in subjects of Syphilis must be carefully ascertained before the mercurial treatment is pushed. It may be benefited by Mercury if it is a manifestation of the disease; but may get worse if it is really mercurial stomatitis

due to the over-dose of the drug pushed to cure the disease in a hurry. During the time when Mercury is given the mouth must be kept scrupulously clean.

Chronic General Suppurative Periodontitis (Pyorrhœa Alveolaris).

Causes.

1. Predisposing.
2. Exciting.
3. Sustaining.

Predisposing Causes.

(a) Local

(b) General

Local.

1. Malocclusion of teeth.
2. Formation of spaces between the teeth, by the recession of the gums, facilitating the accumulation of food stuffs.
3. Localised malnutrition, due to the end-organ nature of the blood circulation.

General.

Systemic diseases such as Tuberculosis, Syphilis, Diabetes, Bright's disease, and other severe fevers may work as predisposing causes by lowering the local vitality of the investing tissues of the teeth, and so preparing them for any infection.

↓ Exciting Causes.

1. Injury and breach in the gum tissue.
2. Local irritants such as tartar, badly done fillings, crowns or dentures.
3. Bacterial accumulations of a specific nature.

These causes, by irritating the periodontal membrane, lead to the inflammation and absorption of the investing tissues, with or without pus formation.

↓ Sustaining Causes

1. Accumulation of sub-gingival tartar. Tartar by further deposition grows by progressing under the gum tissues. Thus working its way in that direction it divests the tooth of the investing membrane and gradually destroys it and the surrounding bone tissue.
2. Accumulations of food-stuffs.
3. Bacteria.

Morbid Anatomy and Pathology.

There is a great deal of difference of opinion on this subject. Some authors think it starts from the inflammation of the gums (Gingivitis) while others think that it originates into the bone of the alveolus through some disturbance of its vascular supply, caused by some general constitutional trouble.

To understand well the nature of Pyorrhœa Alveolaris, the reader must first appreciate that there are two classes of the lesions of the body. They are Sthenic and Asthenic.

228 Sthenic or Inflammatory Lesions.

They comprise those wherein Nature can make active efforts to resist invasion or repair injury. This is only possible when the tissues possess more or less normal vitality *i. e.* have a good blood-supply. How well, the injuries or inflammations in parts abundantly supplied with blood, heal, is well known to the reader.

Asthenic Lesions.

They occur in parts where the blood circulation is low (end-organ nature of circulation) and the nutrition or metabolism is below par. This lesion may be due to local disturbance of circulation, or may be general and due to some constitutional ailment. How easily the lesions, in parts that are badly supplied with arteries, and badly drained by veins degenerate into gangrene, is well known to the reader.

Having discussed these two lesions we will see to what class *Pyorrhœa Alveolaris* belongs and why.

In *Pyorrhœa Alveolaris* the lesion is asthenic, for it occurs in a part (socket of the alveolus) which is scantily supplied with arteries, and badly drained by veins; *i. e.* in a part which is greatly susceptible to venous engorgement or in other words, to **Regional debility**. It can be imagined how easily such low circulation can be upset by general constitutional disturbances such as Pregnancy, old age Rheumatism, Gout, Diabetes, Syphilis &c. To such low nutritive condition, further depressed or not by constitutional disturbances, add some irritation in the form of tartar or badly fitting filling, crown or denture, and infection (bacteria) and *Pyorrhœa Alveolaris* is the result.

Signs and Symptoms.

1. Congestion of the tags of the gum in the spaces between the teeth.
2. Congestion spreads to the whole margin of the gum.
3. Gums slightly swollen and bluish in color.
4. Gums bleed to the touch.
5. Gradual recession of the gums by the destruction of the margin.
6. Formation of the sockets by the destruction of the bone.
7. Oozing out of the pus at the gum margin.
8. Exposed roots covered with dark tartar,
9. Fœtid discharge.
10. Foul offensive breath.
11. Gradual looseness and falling out of the teeth.
12. Congestion of the whole mucous membrane of the mouth, including the tongue and the tonsils.
13. Very unpleasant taste.
14. Recurring hæmorrhage, staining the pillow at night.
15. General malaise and debility.

A very notable feature is the marked absence of pain in these cases. It is occasionally present and is then due to

Rheumatic diathesis, or due to Neuralgia caused by septic infection from the mouth.

Treatment.

1. Prophylactic or preventive.
2. Remedial.

Prophylactic Treatment.

The object of this treatment is the promotion of a clean and cleanable mouth. The mouth can be cleaned by the use of a hard brush, fairly gritty chalk powder, and clean water. Given a healthy mouth to start with, the above treatment will be enough to keep any mouth clean. The routine use of antiseptic mouth-washes or tooth-powders must be condemned. The good use of a hard tooth-brush on all the surfaces of the teeth and gums, and of tooth-picks in the spaces between the teeth, must be encouraged as a sure means to prevent *Pyorrhœa Alveolaris* or for a matter of fact any other disease of the mouth. Great importance must be attached to the brushing and massaging of the gums, for it helps the free flow of the circulation, thus preventing the venous engorgement in the part. Such food as would call forth the mechanism of mastication, and the fruits at the end of every meal must be strongly recommended as a prophylactic treatment. In case of the presence of any unhealthy condition in the mouth, the use of Hydrogen Peroxide as a mouth wash, and Iodine or Myrrh as a paint to the gums, may be advised. They must be discontinued with the disappearance of the conditions that called forth their use. After making the mouth clean, it can be made cleanable by the removal of anything, like a loose tooth, badly

done filling, or an ill fitting crown or a denture, or a misplaced tooth, that will harbour food stuffs or germs, and so hinder the thorough cleaning of the mouth. The importance of the cleaning of the mouth at night, as a prophylactic treatment cannot be exaggerated.

Remedial Treatment.

Before undertaking the treatment it must be made clear to the patient that the damage done prior to the treatment cannot be repaired, and that all that the treatment can do is to irradiate the pus, stop further progress of the trouble, and to restore healthy condition to the diseased tissues. That, for the cure of Pyorrhœa, their co-operation is as essential as the treatment by the dentist, must also be impressed on them.

1. Local treatment.
2. General „

Local Treatment.

It is the most important and consists of the removal of all local irritants that may be present in the form of loose teeth, tartar, ill fitting fillings, crowns or denture. The removal of tartar must be as complete as possible, for any particle however small left behind will work as an irritant and a nidus for further accumulations. As it is the subgingival tartar that is more the cause of Pyorrhœa than the superficial, it must be thoroughly removed. After the removal of tartar the sockets must be syringed out with antiseptics such as Hydrogen Peroxide, and then sterilised by drugs such as Silver nitrate, Zinc chloride, Aromatic Sulphuric acid, Iodine, &c. Of these Silver-nitrate in 10 p. c. solution

in Absolute Alcohol, is strongly recommended. This is the dentist's part of the treatment, and is done during several sittings. Besides this the patient must be instructed to scrupulously clean the teeth with a tooth-brush twice a day, to use hot water gargles to be followed by antiseptic mouth-wash such as Hydrogen Peroxide, and apply massage and some counter-irritants in the form of Iodine and Myrrb to the gums. Of all the items in this treatment, massage of the gums is the most important. It helps to squeeze the pus out of the sockets, and to improve the tone of the surrounding tissues by bringing increased circulation to the part. If faithfully carried out this local treatment is generally enough to cure this trouble in a majority of cases.

General Treatment.

It consists of the treatment of the constitutional troubles underlying it. It depends upon the nature of the systemic disorder, and aims at the elimination of the waste products, the reduction of hyperacidity by the use of alkalies, opening out of the bowels, and elimination of the specific poison in the system.

Sometimes, when Pyorrhœa is associated with general symptoms as its result, Vaccine therapy treatment as an auxiliary to the local treatment, may prove very useful. It helps the local treatment by building up the body resistance by directly attacking and subduing the toxins circulating in the body. It must however be remembered that the general treatment is only an aid to the local treatment described above, and which is the main treatment for Pyorrhœa Alveolaris. In case of this treatment failing to produce good results in a reasonable time, or in case of the general health being badly undermined by Pyorrhœa

the radical treatment, *i.e.*, extraction of all the teeth, may be unhesitatingly advised. Extraction of all the teeth is the best and surest cure of this trouble, and so is very often light-heartedly followed by some people. But such radical line of treatment would be hardly fair on the patients, unless they refused to try more conservative treatment, or that this had been conscientiously tried and had failed, or that it would be too late in the day to try any such treatment.

Of late years several ingenious treatments have been tried and are given up as wanting. It is however fair to mention them here. They are

1. Vaccine—therapy
2. Ionisation.
3. Emetine Hydrochloride injections.
4. Mercury sucinimide injections.
5. High frequency current.
6. Ultra violet rays.

Considering the pathology, that Pyorrhœa is an asthenic lesion occurring in a part with natural regional debility (end-organ circulation) with local irritation and infection as predisposing and exciting causes, the author is not surprised that these treatments have failed. At best they can serve as auxiliary to the local treatment, which is 'par excellence' the treatment for Pyorrhœa Alveolaris. While deciding upon the line of treatment, the factors that should guide one's decision are

1. Whether or not the teeth are savable.

2. Whether the general condition of the patient is such as can stand the conservative treatment, which is essentially a long treatment, or warrants immediate extraction of all teeth.

Conservative treatment is indicated in cases where the teeth can be saved and the general health is good or even fair.

It is contra-indicated in cases where the general health is bad, even though the teeth may be savable.

The condition of general health must guide the line of treatment.

Effects of Pyorrhœa on General System.

All the diseases that the human body is prone to, can be directly or indirectly caused by Pyorrhœa Alveolaris. Of all the systems of the body, the alimentary system, from the tonsils downward, suffers the most from this disease, and all degrees and varieties of tonsillitis, pharyngitis, gastritis, enteritis, and appendicitis may result. All other systems of the body can also be affected either directly through the blood-current (direct injection) or indirectly through the alimentary canal by absorption into the general system, and diseases like adinitis, arthritis, septicæmia, pernicious anæmia, nephritis &c. may result. The infection can also result by contagion, *i.e.*, spreading, to the directly contiguous adjacent parts. A very interesting example of such infection came under the care of the author at the Parsee General Hospital. It was a case of a young girl of about 21. In this case the whole face of the patient was absolutely covered with weeping pustules as the result mostly of direct contagion from the suppurating gums.

All the pustules disappeared within a fortnight after the elimination of the oral sepsis by extraction of all the teeth. As all the systems of the body can be directly or indirectly affected by Pyorrhœa, medical men may be advised to remember this scourge as a probable cause of any trouble in any system of the body, that they may be called upon to treat. It would be in his own interest, and in the interest of his patients that he should begin his examination of the patient with the mouth, for more often than not oral sepsis is, if not direct, the indirect cause of the trouble. Failing to do so, unknown to him or unnoted by him, he would be allowing his patient to retain such sepsis, as he would not allow to remain for a minute were it found in any other part of the body, and be constantly poisoned by it. It is often urged by medical practitioners that the effect of oral sepsis on the general constitution is very much exaggerated and that its ill effects are few and rare compared with its wide prevalence. But the mouth is the gateway of the body, and competent authorities assert that it is through its portals that most, (80 per cent.) of medical sepsis, enter the body; and that its ill effects are indeed very common and very grave. It is indeed very fortunate that they are not more common; and that is due to the considerable resisting power of the oral mucosa, and the antiseptic action of the saliva. To appreciate the connection of oral sepsis and its evil effects, medical men have only to remove the sepsis, and then note the effect of such removal on the evil effects. It is indeed unfortunate that Pyorrhœa is a painless process, and its septic effects go on steadily increasing in virulence without drawing attention to the seat of origin. That such is bound to be the case unless the medical profession realises sepsis, especially oral-sepsis as the most important and the most frequent cause of medical diseases; and so realising it, make it a point to detect and remove it at an early stage.

CHAPTER XVI

TUMOURS OF THE JAW.

The tumours of the jaw may be

- (1) Liquid (2) Solid.

Liquid Tumours.

They are

1. Chronic dento-alveolar abscess.
2. Dental cyst.
3. Dentigerous cyst.

Chronic dento-alveolar abscess is described on p. 78 as local chronic suppurative periodontitis.

Dental Cyst.

It occurs in connection with the root of a fully developed and erupted tooth, and in those stray remnants of the epithelial layer of the inflected tooth-band. It occurs as a result of irritation and infection from a septic tooth. It occurs most in connection with the molars. It grows by the proliferation of the peripheral cells, and by the breaking down and liquid degeneration of the central cells. As it grows, the increasing liquid contents, pressing and perforating the thin outer plate of the alveolus, bursts into the surrounding soft tissues.

Signs and Symptoms.

1. Smooth, globular swelling.
2. Slow but continuous growth.

3. Absence of symptoms of inflammation.
4. Presence of a badly decayed tooth over the tumour.
5. Free mobility of the mucous membrane over the tumour.
6. Egg-shell-crackling, when the tumour is of considerable size.
7. Fluctuation when the bone is perforated.
8. Distinct bony edge in the area of fluctuation.

Differential Diagnosis.

Dental cysts must be distinguished from the other fluid tumours of the jaw, viz. Chronic dento alveolar abscess, and the Dentigerous cyst. The points of difference are.

| Dental cyst. | Chronic abscess. |
|--|---|
| 1. Smooth globular swelling... | Same. |
| 2. Very slow growth | Not so slow. |
| 3. Continuous growth | Growth intermittant |
| 4. Absence of the symptoms of inflammation... .. | Inflammatory symptoms present. |
| 5. Mucous membrane always free over the tumour ... | It is generally adherent to the tumour. |
| 6. Egg-shell-crackling present when the tumour is of considerable size ... | Absence of such crackling. |
| 7. Distinct bony edge in the area of fluctuation ... | No such edge is felt. |
| 8. Absence of pain | Pain is sometimes present, especially when the abscess fills. |

The signs and symptoms of dental and dentigerous cysts are practically the same; with one diagnostic exception and that is, that in case of the dental cyst, there is always the presence of a badly decayed tooth over the tumour, or if the tooth is absent there is always the history of extraction; while in case of the dentigerous cyst there is congenital absence of the tooth over the region of the cyst, for the dentigerous cyst always forms around an unerupted tooth. Very often that unerupted tooth is found inside the cyst cavity.

Of all the liquid tumours of the jaw the chronic alveolar abscess is the most frequent, next comes the dental cyst, the dentigerous cyst being the least common of all.

Treatment.

It is more a surgical than a dental operation, and consists of the removal of the cause i. e. of the septic tooth; opening out of the cyst cavity by removing its outer wall; dissecting or scraping out of the cyst walls, and packing the cavity with Iodoform gauze to allow it to heal by granulation. Great care must be taken to scrape the walls thoroughly, for any portion allowed to remain will help the recurrence of the growth.

Solid Tumours.

Epulis.

Epulis is a solid tumour of the periodontal membrane. It is fibroid in nature and is very slow in growth. It is mostly found in the mandible. Till lately it was supposed to be a benign tumour of the gum, but it is now proved

to be a tumour of the periodontal membrane with some malignancy about it, for it has a decided tendency to recur if not properly treated.

Treatment.

The treatment consists of the thorough removal of the tumour together with the adjacent soft and bony tissues. It must be distinguished from the Polypus of the gum, and treated accordingly. Mere snipping away of the tumour and cauterisation of the peduncle as is done in the tumour (polypus) of the gum, will not suffice, for the tumour will recur unless its roots in the periodontal membrane and adjacent bone are destroyed.

Odontomes.

An Odontome is a solid tumour of the jaw composed of dental tissues in varying proportions and different degrees of development. It is an aberration of a tooth-germ or a tooth in the process of development. It is a very rare tumour with a very slow growth. It is formed from the different portions of the tooth-germ. That after its existence of over sixty years the Grant Medical College possesses just one specimen of this odontome (complex composite odontome) is a testimony to the rarity of this tumour.

The treatment consists of its removal as soon as it is recognised.

CHAPTER XVII.

DISEASES OF THE GUMS AND THE ORAL MUCOUS MEMBRANE.

INFLAMMATION.

- (a) Inflammation of the gums only *i.e.* gingivitis.
- (b) Inflammation of the gums together with the surrounding mucous surfaces *i.e.* stomatitis.

Gingivitis.

To well understand this subject one must know the anatomy of the parts surrounding a tooth.

The gum blends with the periodontal membrane at the neck of the tooth. At their junction there is a marked intensity of the fibrous tissue, which is called the Dental Ligament. The gum so blends with the periodontal membrane, and through it to the Cementum at the neck of the tooth, that it forms a sort of a pouch. In this pouch is contained a mass of epithelial cells, called the Gingival Organ. It is this Gingival organ that is responsible for the causation of the inflammation of the part. It possesses the function of selecting and secreting from the blood, serum containing certain poisons which set up the inflammation in the part.

Varieties.

- (a) Acute or Catarrhal gingivitis.
- (b) Chronic hypertrophic gingivitis or the Polypus of the gum.

Causes.

They are (1) Local, and (2) General.

Local Causes.

1. Tartar.
2. Food accumulation
3. Badly done fillings, crowns, or dentures.
4. Chemical irritants e.g. escape of drugs like Arsenic Formaline, and Carbolic on the gums.

General Causes

1. Overdose of drugs like Mercury, Iodides, and Lead.
2. Chronic constitutional disturbances such as Gout, Diabetes, and Rheumatism.

Signs and Symptoms.

1. Redness of the free margins of the gum.
2. Pain in the gums.
3. Gums bleed at the slightest touch.

Treatment.

It consists of the removal of any local cause in the form of a badly done filling or crown, deposit of tartar &c. Hot antiseptic and astringent mouth-wash, and counter-irritant to the gums may be prescribed. This is all the treatment needed in acute cases. In case of the chronic hypertrophy (Polyps of the gum) the growth must be

thoroughly removed and the peduncle well cauterised with Silver-nitrate or Caustic potash or the electric cautery.

If the condition is due to any general cause, it must also be treated along with the local condition. If there is any constitutional derangement underlying the trouble it must be treated simultaneously with the local condition. If the general cause is in the nature of an overdose of any drug, it must immediately be stopped and antidotes given to counteract its effects.

When Lead-poisoning is the cause, the gum presents a characteristic appearance in the form of a dark blue line running under its free margin. This line appears more on the lower gums than on the upper; more in the incisor region than in the molar; more in the regions where the teeth are present than where the teeth are lost; and more in the regions irritated by tartar than where there is no such irritation. The mere presence of this blue line is not enough to diagnose Lead-poisoning for such line also occurs under other conditions. Lead-poisoning presents other more characteristic symptoms than this blue line, and they are colic, and wrist drop. The blue line in the presence of the other symptoms is a positive sign, but is of doubtful utility in the absence of other signs, for such a line also occurs in,

1. Persons working in white lead.
2. Persons using charcoal as a dentifrice.
3. Persons working in mines and carbon dusts.
4. Persons affected with Copper and Bismuth poisoning.
5. And in case of the deposition of dark tartar under the free margin of the gums.

STOMATITIS.

It is the inflammation of the mucous membrane of the whole mouth.

Varieties.

1. Catarrhal.
2. Mercurial.
3. *Ulcerative.*
4. Parasitic.

Catarrhal Stomatitis.**Causes.**

1. Exanthematous fevers.
2. *Severe troubles of the alimentary canal.*
3. Excessive use of tobacco.

Signs and Symptoms.

1. Redness and swelling of all the mucous membranes.
2. Redness and swelling particularly marked in the gums.
3. Pain in the gums.
4. Gums bleed at the slightest provocation.
5. General soreness of the mouth.
6. Foul breath.

Treatment.

The treatment consists of the administration of Chlorate of Potash internally, and also locally as a mouth-wash. This drug has a specific effect on this condition.

R/.

| | | | |
|--------------------------|-----|-----|-------|
| Liquor Ferri Perchloridi | ... | ... | m ii |
| Pot Chloras | ... | ... | gr. v |
| Aqua Aurantii | ... | ... | ℥ i |
| Aqua | ... | ... | ℥ 1 |
| Prepare 4 oz. | | | |

One teaspoonful 3 times a day after meals.

R/.

| | | | |
|---------------------|-----|-----|-----|
| Pot Chloras | ... | ... | ℥ i |
| Acid Hydrochlor Dil | ... | ... | ℥ ½ |
| Aqua | ... | ad. | o i |

To be used frequently as gargles.

Bowels must be opened out. Ulcers if formed must be treated with 10-20 p. c. solution of Silver-nitrate.

Parasitic Stomatitis.

Varieties.

1. Syphilitic stomatitis.
2. Thrush stomatitis.
3. Aphthous stomatitis.

Syphilitic Stomatitis.

Though rarely, syphilis does manifest itself in the mouth in all its three stages. One may be cautioned against diagnosing all inflammations in the mouth in subjects of syphilis, as syphilitic stomatitis, for often that inflammation may be due to the overdose of Mercury (Mercurial stomatitis) taken in undue anxiety and hurry to cure the disease, and may be made worse by further administration of that drug.

Treatment.

It consists of the administration of Mercury in judicious doses internally. It may be given by itself or mixed with Pot Iodide. It is imperative that the mouth must be kept clean during the whole course of the Mercurial treatment. Hydrarg Perchloride in 1-2500 to 1-5000 solution may be given as a mouth-wash.

Thrush-Stomatitis.

It is due to a fungus called *Saccharomyces Albicans*, and commonly occurs in infants especially bottle-fed ones. It may also occur in adults, as a result of some acute specific fever or some chronic wasting disease, as Consumption. In that case it is an indication of a fatal end.

Signs and Symptoms.

Besides all the signs found in the catarrhal variety there are

1. Firmly adherent white spots on the mucous membrane.

2. Looseness of bowels.
3. Green acrid evacuations.
4. Erythematous eruptions on the buttocks and margins of the anus.
5. Marked drowsiness and stupor in the child.

Treatment.

It consists of wiping the mouth clean with lint soaked in the solution of Borax (three drachms in one ounce of water after each feed; and touching the ulcers with Silver-nitrate solution 5-10 gr. to an ounce. Good care must be taken of the feeding bottle, and the bowels must be kept open with gentle aperients.

Aphthous Stomatitis.

It almost always occurs in rachitic or weakly infants especially at the time of teething. It rarely occurs in adults, but sometimes occurs in women during the Critical periods *i. e.* menstruation, pregnancy and menopause.

Signs and Symptoms.

1. White elevated mucous patches with a zone of inflammation around them.
2. Rise of temperature.
3. Loss of appetite.
4. General malaise.

Treatment.

It consists of the use of Chlorate of Potash mouth-wash (vide P. 102); and touching the patches with Silver-nitrate.

Scurvy.

Signs and Symptoms.

1. Dark, spongy, and swollen gums.
2. Slight bleeding at first.
3. Constant oozing of blood in later stages.
4. Marked contrast in the colour of the gums, that is quite red against the pale white of the mucous membrane of the cheeks and lips.
5. Sloughing of the margins of the gums and loosening of the teeth in later stages.
6. Other general symptoms of the disease.

Treatment.

Local mouth treatment consists in keeping the mouth scrupulously clean, hot water fomentations, and counter-irritants to the gums. Internally Lime or Lemon juice may also be given.

CHAPTER XVIII

Treatment of Children and Their Teeth.

That world famous saying of Gœthe "Little can be accomplished with the adults, the intelligent man starts with the child" is as true in case of dentistry as in all other walks of life. Early childhood is the best time to prevent the immediate as well as the distant dental troubles, and so also their consequent ill effects on the general health. That is also the best time to cure any trouble if there be any existing. The importance of healthy infancy and childhood on the future general health, cannot be exaggerated; and in assuring such healthy infancy a good dental surgeon can play a considerable part. His work consists of two parts.

1. Prevention of the dental disease.
2. Curing the disease when it is present.

Prevention or Prophylactic Treatment.

As it is maintained that every child is, or at least should be born normal and healthy, and as the teeth begin to form during the intra-uterine life, the preventive treatment must start with the mother when she is carrying the child. On her condition during the period of pregnancy will depend the future health of the child; and her condition can only be as good as her mouth. As the mouth becomes particularly liable to dental troubles during the period of pregnancy, because of the highly acid condition of the saliva and vomiting during that period, it is imperative that the mother must take a good deal of care of her mouth during that time. The reason why so many mouths are

found to be ruined by severe dental troubles particularly during and after the period of gestation, is the prevalence amongst the mothers of some wrong beliefs, *viz.*

1. That dental treatment done during the period of pregnancy, disfigures the child by birthmarks and weakens it.
2. That it is natural for a woman to suffer from dental and mouth troubles during gestation; and that she must expect to lose at least one tooth for every child she brings in this world.
3. That the dental treatment done during that period will give a shock to the patient and so cause miscarriage or abortion.

It is unfortunate that women are often encouraged by some section of the medical profession in these superstitious beliefs. The reason, why these women and even medical men have come to believe in these superstitions, is the excessive frequency of dental and mouth diseases during and after gestation. Dental troubles during the period are so common that they are now believed to be the natural sequence of pregnancy, and not the pathological sequence, due to neglect, that they indeed are. Medical practitioners may be advised to strongly urge the care of the teeth and mouth during the period of pregnancy, and also unhesitatingly recommend whatsoever dental treatment that may be needed. They can safely do so without fear of disfiguring or weakening the child, or causing miscarriage or abortion. In fact by avoiding such treatment they will allow the constant tooth-ache or poison absorbed from the oral sepsis, to give a shock and so cause the abortion that they try to avoid.

Breast-feeding.

It is, or it should be the ambition of every mother, to bring up the child on her own milk; and nothing can help her more to realise that ambition, than the scrupulous care of her mouth during the periods of pregnancy and nursing. The unhealthy condition of the mother's mouth, not only decreases the flow of milk, but actually contaminates it not only with the toxins of the germs existing in her mouth but actually with the germs present there. Mother's milk when uncontaminated with maternal sepsis, is the best food for the child, for

1. It contains all the materials that are needed for the good development of the human body.
2. It contains these materials in the most easily assimilable form.
3. It affords certain immunity to the child against the ordinary infantile troubles such as vomiting, diarrhoea, whooping cough, measles, etc.
4. Breast-feeding helps to form a well-shaped mouth, with ample room to contain the full dental armament of the future.
5. It helps the tooth-tissue to be sound and strong.
6. It helps to prevent Adenoids, and their evil consequences.

Wherever possible the child must necessarily be brought up on breast-feeding ; but when that is not possible the recourse has to be taken to artificial feeding. In that case the feed of cow's milk, diluted or undiluted, by feeding bottles is the best. Care must be taken to keep the bottles

and teats scrupulously clean. There is a considerable tendency amongst the lay public and also the medical profession, in favour of the artificially prepared patent foods, in preference to cow's milk. Their reason is that cow's milk when boiled for sterilisation loses its nutrient property, and as such causes Scurvy and Rickets, in children. But the common daily experience not only does not support their theory, but shows that on the contrary it is these prepared foods that give rise to these diseases. These foods are certainly not conducive to the welfare of the teeth and the digestion of the children.

Hygiene of the Infant's Mouth.

There is a rooted belief among the lay public and also the medical profession, that the infant diseases like diarrhoea, vomiting, convulsions occurring during the first year are the physiological sequence of the process of teething. These diseases are so common during that period, that people now actually believe them to be the natural sequence of this physiological process. These troubles are now generally believed to be due to the unhealthy condition usually existing in the mouth during this period, and not to the process of teething. Teething often acts as the predisposing cause, but it certainly is not the cause of these troubles. This fact should impress one with the urgent need of oral hygiene from early infancy. The hygiene of the mouth of the infant can very easily be accomplished by wiping clean the gums and other mucous surfaces with a coarse piece of lint soaked in ordinary water or as is usually done with Boroglyceride, after every feed. With this cleaning a certain amount of friction in the way of massage must also be applied to the gums. That will bring the increased circulation to the part, and so help the development of the

jaws to their full growth, and the ordered progress of the process of eruption (teething) of the teeth.

Teething.

The appearance of the first tooth in the mouth at the age of about the 6th month, is the call of Nature to the mother to make a change in the hitherto liquid diet of the infant, by adding some solid to it. This solid part must be given in real solid form, and not in the form of solids soaked in liquids, as is usually done by fond mothers from fear of hurting the baby's teeth and digestion. It must be impressed on them that the solid must be given in real solid form, and that the tooth appears in the mouth to cut and gnaw that solid food. That solid food far from hurting the teeth and digestion, will help them and the jaws to develop well, to keep themselves clean and so immune from caries, and improve the digestion of the child by exciting the flow of saliva which is essential for the initial stage of the process of digestion. When the teeth appear in the mouth they must also be cleaned along with the other parts of the mouth. This may be done during the first 2-3 years with coarse lint and water; but after that age a fairly hard brush may be safely used. As an extra precaution mothers may be advised to have their children examined by a dentist every 3-6 months. This will ensure the prevention of any dental trouble or its easy and rapid cure if any creeps in by some chance.

Comforter Sucking.

Babies are generally restless and troublesome during that early age of between 6th—24th month. To keep them quiet mothers take recourse to a nasty device called the Comforter. This practice of comforter-sucking must be con-

demned, for it does considerable amount of harm to the babies in the form of

1. Gripping pain in the stomach due to the passage of air during the sucking of the comforter.
2. Protrusion of the front teeth, disfiguring the looks of the child.
3. Growth of Adenoids in the back of the nose.

Mouth-breathing.

As the child grows in age a condition that draws one's attention is the tendency of the infant to keep the mouth open to breathe through. This condition of the open mouth means that there is a block or obstruction in the nasal passages, and so the child is trying to take the air in through the mouth. This condition of the open-mouth, or mouth-breathing if not readily checked, has far-reaching effects on the general constitution of the body. (Vide Pp. 32-33) Its effects on the teeth and jaws are

1. General dryness of the mouth.
2. Abundance of caries.
3. Teeth covered with abundant deposits of tartar.
4. Bite disorganised.
5. Narrowed, high vaulted arch.
6. Protrusion of the front upper teeth.
7. General contour of the face narrow, sunken, and protruding.

As the child advances in age and more teeth come in the mouth, more solids may be added to the diet; which must be entirely solid by the age of 3 years. This will accustom the child to such food as would give the teeth and jaws the exercise needed for their proper development, and would also help to keep them clean. Given such food Nature's own cleansers and polishers, (tongue, lips and cheeks) do the rest to keep the teeth and mouth clean and functional.

After the age of three years, when the whole of the deciduous set is complete, the child must be made to clean his teeth himself by means of a hard tooth-brush, with some gritty chalk-powder added to it at some later date.

It is indeed unfortunate that the importance of this set for the welfare of the permanent teeth and the general constitution of the body, is not realised by the medical profession. They think that as they are temporary and are going to fall out, they can be neglected and allowed to decay, and when decayed they can be unhesitatingly extracted. These teeth are as essential to the child as the permanent teeth are to the adult. These teeth are meant to last till their successors in the second set come in, and they can be and must be made to do so by preventing any disease affecting them, and promptly curing the disease if any is present.

Curative Treatment.

As suggested in the preventive treatment, dental supervision must begin at a very early date, for then the cavities can be well and painlessly treated while quite small, and the teeth easily saved. Curative treatment is purely dental treatment and medical practitioners may be advised to refer

the case as soon as possible to the dentist. Where the dental aid is not available, the curative treatment they can do is to try to arrest the progress of caries by the application of a drug like Silver-nitrate to the carious portion, once a week for four weeks; and instructing the patient to apply Rectified Spirit to the part after drying the tooth, and allow it to evaporate.

Another curative treatment that they can do is the extraction of very badly decayed teeth, especially the second deciduous molar when the first permanent molar is standing adjacent to it. Such extraction *done in time*, will isolate the permanent molar and so make it safe from the infection from the other.

CHAPTER XIX

DENTAL PAINS AND THEIR DIAGNOSIS.

Dental pains may be considered under two headings.

1. *Odontalgia* i.e. the pain caused by the irritation of the sensory nerve in the tooth, and felt either in the same tooth or any other tooth.

2. *Neuralgia* i.e. the pain caused by the irritation of the nerve in the tooth, but felt in parts supplied by the peripheral branches of the nerve that supplies that tooth.

To well understand these pains two facts (one physiological and one anatomical) must be appreciated. They are

- (a) That irritation of any one part of a nerve, may cause pain in any other part of that nerve or its branches. Thus the irritation of the nerve in any one tooth can give pain in that tooth, or in any other tooth or in any part supplied by the branches of the 5th or Trigeminal nerve on the same side as the offending tooth.
- (b) That Dental nerve is a branch of the 5th or Trigeminal nerve, which is intimately connected with the Glosso-pharyngeal nerve, and the Vagus nerve which supplies the abdominal and pelvic viscera. This condition is responsible for pain, due to the morbid condition of the Uterus, being felt in the tooth, or the pain in the tooth being felt in the Uterus.

The writer had a case of a multipara who complained of pain in a badly decayed tooth and also in the uterus. Considering that she was a multipara who had carried

her previous pregnancies to full term without any untoward symptoms, the tooth was diagnosed to be the cause of pain (local) and pain in the uterus, and so was extracted, with the result that the pain both in the tooth and uterus subsided.

Odontalgia.

It may be local and confined to the tooth where it originates, or reflected and felt in the tooth other than that where it originates. It may be due to the morbid condition of either the pulp of the tooth (pulpitis) or the periodontal membrane (periodontitis). Its nature varies according to its cause.

Pain due to

Pulp.

1. Pain sharp, shooting and paroxysmal.
2. Pain more in the night due to cooler temperature.
3. Pain more in the reclining posture, due to the increased flow of blood to the part.
4. Pain caused by thermal stimuli.
5. Gentle pressure in the tooth-cavity will cause pain.
6. Tooth not tender to touch or pressure.

Periodontal membrane.

- Pain dull, gnawing and continuous.
- Not so.
- Same is the case but not so marked.
- Such is not the case.
- No pain felt at such gentle pressure; but it can be felt when that pressure is increased.
- Tooth is tender to touch or pressure.

In chronic cases the symptoms are the same, but are less marked.

Treatment.

If due to pulpitis the pain can be relieved by the application of sedatives such as Oil of Cloves, Carbolic Acid, Tinc Opī, Absolute Alcohol, Rectified Spirit &c. The popular household remedy of plugging the cavity with cotton soaked in Brandy or gargling with Brandy or Whisky in water is quite good. When the pain is due to the exposure of the pulp, the medical practitioner may be advised to refer the case, after giving immediate though temporary relief, to the dentist for devitalisation of the pulp and further treatment of the cavity. When the pain is due to periodontitis, it can be relieved by the application of hot fomentations and counter-irritants to the gums. In severe cases the gums may even be scarified.

Referred Odontalgia.

It is at once an interesting and important subject for or the correct recognition of the cause will depend the success of the treatment.

Causes.

1. Peripheral irritation.
2. Cerebral or Central irritation.
3. Constitutional disorders.

Peripheral Irritation.

Irritation of any branch of the 5th nerve may cause pain in any part or branch of that nerve. In view of this fact it is indeed very common for the patients to complain of the pain in an apparently healthy tooth while the real

site of pain is the other tooth or mucous surface supplied by the fifth nerve of that side. It is common for the patients to feel in the premolars, the pain that really originates in the 3rd molar of that side. This pain can be felt in one jaw when the cause may be in the other; but it must necessarily be on the same side of it. Pain can never be referred to the other side of the jaw, for that is supplied by the other 5th nerve. It is interesting to note that the pain in a tooth, may be due to the morbid conditions of the Uterus and Kidneys. This is possible because of the connection of the dental branches with the Vagus which supplies these organs.

Central Irritation.

Odontalgia of the central origin may be due to either functional disturbance or organic lesion of the central nervous system. I shall mention here three cases of such origin that came under my care.

No. 1.—Functional disturbance or Hysterical manifestation

A lady aged about 30, complained of some vague annoying pain in the left lower jaw, where there was a filling in the 1st molar done by an unqualified man, and another cavity in the 3rd molar. There was fair amount of tartar also. She also complained of annoying headaches. The tartar was thoroughly removed, the filling in the 1st molar was undone and the cavity was filled after thorough treatment of the root canals; and the cavity in the 3rd molar was also treated and filled; with the result that the patient felt better. After a few days she came back with a similar history of pain on the other side. There was a cavity in the 3rd molar which was treated and filled in, with the result that the

pain disappeared. After a few days she reappeared this time with pain on both sides. She was thoroughly examined and nothing that could give such pain was found. After that examination and the very vague history of vague pains, I felt that it was a case of hysterical manifestation.

No. 2.—Another very good case of pain due to the functional disorder of the central nervous system, was the case of a lunatic attending the out-patients department of the Sir J. J. Hospital. He appeared for the first time complaining of vague pain all over the head and in all the teeth, but pointed one molar as the seat of that pain. That tooth was thoroughly examined and found to be quite normal. However as he insisted on its removal, it was extracted. Next time he came and asked for the removal of the neighbouring pre-molar though quite normal, for according to him it was the cause of pain. No tooth was removed at the time but the patient was instructed to apply gum paint to the gums. Since then he often reappeared pointing to a different tooth each time and waiting it to be removed, but had to be sent back each time without his wish being gratified. He however succeeded in getting some teeth removed in my absence by some students, who not understanding the case did the extractions for him. Since this time orders were given not to admit him on days other than mine. Finding himself constantly being refused extractions every time he came, he has at last given up putting in his appearance for now quite a long time.

No. 3.—It is a case of a young lady, subject of Lateral Scoliosis. When she came first she complained of vague pains, varying in intensity, in all her teeth and gums. She had several fillings done by two or three dentists, and there was a fair amount of tartar on all her teeth. The tartar was thoroughly removed and the fillings were undone

and cavities filled again, but with no such satisfactory result as was expected by me. She was so tired with the pain that we discussed the possibility of relief from pain by the removal of all the teeth. She consented and all the teeth were removed, but as was expected the pain though considerably less still persists. She feels it more when she wears the plates, than when she is without them. This is a true case of odontalgia due to the organic disturbance of the central nervous system.

Constitutional Disorders.

Diseases such as Syphilis, Malaria, and Rheumatism may cause odontalgia. The pain disappears under the treatment of these disorders.

Neuralgia (Trigeminal).

Among the causes of this condition, dental troubles play a considerable part. They are

1. Morbid conditions of the tooth-pulp.
2. " " " periodontal membrane.
3. " " " gums and mucous membrane.

The trigeminal pain, when due to dental trouble, is located in certain areas of the face and head, called the **Segmental areas of Head**, and each area bears exact relationship with some particular tooth. The following table will show the teeth and the areas on the face to which the pain is generally referred when they are diseased.

| Teeth. | Areas. |
|---|---|
| 1. Upper Incisors ... | Fronto-nasal. (Portion of the forehead above the root of the nose, and some portion of the side of the nose). |
| 2. Upper Canine and 1st Premolar. | Naso-labial (portion over the upper lip, tip and under-surface of the nose, and cheek) |
| 3. Upper 2nd Premolar. | Temporal (portion just above the temporal fossa) and Maxillary (portion of the cheek just under the eye). |
| 4. Upper 1st Molar ... | Maxillary. |
| 5. Upper 2nd Molar... | Mandibular (portion over the coronoid process, ascending ramus, and part of the body of the mandible). |
| 6. Upper 3rd Molar... | Mandibular and Hyoid (portion over the back part of the ascending ramus and portion behind the posterior border). |
| 7. Lower Incisors, Canine and 1st Premolar. | Mental (portion under the lower lip between the angle and the symphysis). |
| 8. Lower 2nd Premolar. | Doubtful. Mental or Hyoid. |
| 9. Lower 1st and 2nd Molars. | Hyoid (pain in the ear). |

Teeth.

Areas.

10. Lower 3rd Molar

Superior Laryngial (portion in the neck) just under the Hyoid area, extending between the anterior border of the Sterno—Mastoid and the Thyroid cartilage.

Diagnosis.

The fact that the dental trouble is the most frequent cause of the trigeminal neuralgia, must be remembered while ascertaining the cause of the case in hand. To ascertain that, inquiry into the character and the situation of the pain must be made, for that will help in localising the cause and ascertaining its nature. Infra or supra orbital pain will point to the upper jaw as the seat of the cause of that pain, putting out of court the lower jaw. The pain in the ear and shooting down the shoulder will point the lower jaw as the seat of its cause. Pain in the parietal region may be caused by trouble in either the upper or lower jaw. The sharp, shooting and paroxysmal nature of pain will suggest the exposure and inflammation of the tooth-pulp; while dull, continuous pain will suggest the inflammation of the periodontal membrane as its cause. Having noted these points the mouth must be searched for the cause which may be in the form of an exposed tooth-pulp, inflammation of the gums or periodontal membrane, or general suppurative periodontitis, otherwise called *Pyorrhœa Alveolaris*. *Pyorrhœa* is often a fruitful cause of trigeminal neuralgia. In case of the absence of any of these causes, the probability of an unerupted 3rd molar on that side, as the factor in the causation of the trouble may be seriously considered, for very often unerupted teeth are known to cause trigeminal

pain. They are even known to have caused perverse functioning of the brain cells, sometimes leading on to the commitment of criminal offences. The recognition by the medical profession of dental pain and oral sepsis as a cause of the perverse functioning of the brain, has led to the adoption, by the upto-date lunatic asylums in Western countries, of the system of dental supervision and care of their inmates.

Failing to find any cause in the mouth cavity, it may be searched in other parts supplied by the trigeminal nerve.

Treatment.

The dental treatment of Trigeminal pain consists of treating the cause. The treatment of those various conditions is described under those headings.

AFFECTIONS CAUSED BY DISEASED TEETH AND ORAL SEPSIS.

As shown in the following table all the systems of the body are affected by diseased teeth and oral sepsis. They get affected by

- (a) Reflex irritation.
- (b) Direct pathological sequence.
- (c) Absorption of the septic material.

| System | Reflex irritation. | Direct pathological sequence. | Septic absorption. |
|---------------------|---------------------------------|---|--------------------|
| 1. Brain | Epilepsy, Hysteria | | Septic meningitis. |
| 2. Muscular system. | Spasmodic closure of the mouth. | (a) Facial paralysis due to the involvement of the Facial nerve in direct inflammation. (b) Closure of the mouth due to the spread of inflammation to the soft tissues round the mandibular joint. | |

| System. | Reflex irritation. | Direct pathological sequence | Septic absorption. |
|----------------------|---|---|---|
| 3. Ear ... | Neuralgia of the middle and external ear. | Inflammation of the ear through the Eustachian tube. | |
| 4. Eye ... | (a) Corneal ulcers. It is interesting to note their occasional obstinacy against healing, when they are irritated by a decayed tooth. They heal only when that irritation is allayed. (b) Temporary squint (c) Spasms of the eye-lids. | Inflammation of eye structures due to the spreading of the inflammation through the antrum. | |
| 5. Lymphatic system. | | | Lymphadenitis <i>i.e.</i> inflammation of the glands of |

the neck. The groups affected are superficial and deep parotid which drain the region of the maxillary teeth; and the submaxillary and the superficial sterno-mastoid which drain the mandible. This condition though generally called Tubercular glands, is only a condition of chronic inflammation. However they form a suitable ground for infection by Tubercle. This condition of lymphadenitis or so called tubercular glands, can be easily prevented by the cleanliness of the mouths of children from the very early age. This is amply proved by the city of Strassburgh, which now

| System. | Reflex irritation. | Direct pathological sequence. | Septic absorption |
|------------------------|--------------------|-------------------------------|---|
| 6. Alimentary system. | | | boasts of having eradicated Tuberculosis from its limits by adopting the system of "compulsory and free dental supervision and treatment of children in schools." |
| 7. Circulatory system. | | | (a) Gastritis. (b) Enteritis. (c) Appendicitis. |
| 8. Urinary system. | | | (a) Endocarditis. (b) Pernicious anæmia, and general debility. (a) Nephritis. (b) Rheumatism. |

CHAPTER XXI

EXTRACTION OF TEETH.

Instruments needed for the operation of extraction are

1. Forceps.
2. Elevators.
3. Screws.

Forceps.

They are made of fine steel, light and yet strong to bear the pressure that may be put on them without bending. They are designed to suit the form of the roots of the teeth they are supposed to extract. The forceps for the upper front teeth have the blades in the same line as the handles. Each of the blades has got a rounded hollow on the inside to accommodate the single circular root of the front upper teeth. The forceps for the back upper teeth have the handles forming a curve with the blades. This curve allows the blades to reach the teeth in the back of the mouth. The two blades of the upper molar forceps have a space left between them, and each is designed differently. The inner blade has a hollow in the inside of it to accommodate the round inner root, and has a rounded end. The outer blade has a pointed beak which is meant to go between the two outer roots of an upper molar. In the forceps designed to extract roots in the upper jaw the blades are made to meet each other.

In the lower forceps the blades are arranged practically at right angles to the handles. The forceps designed for the lower roots or the lower front teeth and the premolars

have the blades meeting each other; while in those for the back teeth the blades do not meet, and each blade has a pointed beak meant to go between the two roots of a lower molar.

Method of holding the Forceps.

The forceps must be firmly held in the palm of the hand with the thumb placed between the two handles to serve as a guide for the amount of pressure to be put on them. The little finger must be used to open out the handles as much as desired.

Elevators.

The elevator is an instrument consisting of two parts, the handle and the blade. It is almost exclusively used in the extraction of badly broken or decayed roots in the lower jaw. The point of the blade may be rounded or may be pointed. The blade is flat and roughened on one side, and rounded and smooth on the other. The method of holding the instrument is to hold it firmly in the palm of the hand, with the index finger extending well up to the end of the blade to prevent the instrument from slipping during the operation.

Method of Application.

Having held the instrument in the way described above the point is to be pushed as low down the tooth as possible and the upper part of the blade is to be rested on the tooth in front of it, to be used as a fulcrum. Having thus adjusted the elevator a lever or crow-bar action is to be applied to the handle. If the instrument is well adjusted and the lever action properly applied to the handle, the tooth is elevated out of its socket.

Dangers of the Operation.

1. Injury to the soft tissues, if care is not taken to prevent the instrument from slipping during the operation. Sometimes the floor of the mouth has been pierced during the operation, by the slipping of the instrument.

2. Fracture of the tooth that is used as the fulcrum during the operation.

Screw.

The Screw is a T-shaped instrument, consisting of two parts, the handle and the blade. The point of the blade has got the screw threads on it. It is used to extract the deep seated upper incisor and canine roots. After the screw part of the blade is well screwed into the root canal, the root is extracted by a gentle pull on the handle of the instrument.

Position of the Operator.

The position of the operator varies according to the side from which the tooth is to be extracted. For the extractions from the upper jaw, and left lower jaw the operator must stand on the right side and slightly in front of the patient. For the extraction from the right lower jaw, the operator must stand behind the patient. With the instrument in the right hand, he must use the fingers (thumb and the index finger, or the index and the middle finger) of the left hand

- (a) To clear the field of operation, by pushing away the cheek and other soft parts.

- (b) To steady the upper jaw during the extraction of the upper tooth.
- (c) To support the mandible, to avoid its dislocation, during the extraction of a lower tooth.
- (d) To grasp the alveolus to prevent the slipping of the instrument, and to feel the amount and effect of the force applied.

Anatomy of the Teeth and Jaws.

The knowledge of the number and the nature of the roots of the tooth to be extracted, and the nature of the bone round it, is very important for the success of the operation. On such knowledge will depend the selection of the right instrument for that particular operation, and the manipulations to be applied during it. All the teeth may be divided into three classes.

1. Teeth with single, but round tapering roots e.g. upper incisors, and lower premolars.
2. Teeth with single, but slightly flattened roots e.g. upper incisors and canines.
3. Teeth with more than one root, e.g. upper and lower molars.

The points to be noted in connection with the jaws are that the outer alveolar bone in both jaws is much thinner than the inner, except in the region of the third molars especially the lowers.

Operation of Extraction by Forceps.

This operation is a matter more of manipulative skill than of brute force. It may be described in the following stages.

1. Application of the Forceps.

The blades of the forceps must be applied to the sides of the tooth in its long axis, and between the tooth and the gums. This manipulation will prevent the fracture of the tooth and the *undue laceration of the gum tissue*.

2. Pushing of the blades of the forceps under the gum and the bone margin.

The objects achieved by this manipulation are :

- (a) Destruction of the periodontal membrane that binds the tooth to the socket, thus loosening the tooth.
- (b) Dilatation of the bony socket, and loosening of the tooth.
- (c) Reaching the top part of the root, which is the strongest portion of the tooth to be caught in the blades of the forceps. When the tooth is so secured in the forceps, the chances of its fracture are very small.

Care however must be taken while extracting the temporary teeth, not to push the forceps more than necessary, lest one should injure the underlying freshly developing permanent tooth. Special care must be taken in case of the temporary molar as the roots of this tooth embrace the crown of the freshly developing permanent premolar.

5. Holding of the tooth firmly in the blades of the forceps to prevent their slipping during the operation.

4. Application of rotary movement in case of teeth with single, cylindrical roots, and lateral movement in case of teeth with multiple or flattened roots. While applying the lateral movement, the handle of the forceps must be moved inward first with the object of either dilating or breaking the thin outer alveolar wall. Having accomplished this, move the forceps outwards, with the object of detaching the soft tissues binding the tooth to the thick inner alveolus.

The tooth now is quite loose in the socket ready to be extracted by

5. A gentle pulling or levering out.

Wounds of the Operation of Extraction.

The wound of extraction heals by granulation, that replaces the coagulated blood in the socket from which the tooth is removed. The granulation tissue in its turn is replaced by the cancellous bony tissue. The breach in the gum tissue is filled up by the cicatricial fibrous tissue. The wound must always be treated by some antiseptic mouth wash such as:

R.

| | | | | | | |
|-----------------------|-----|-----|-----|-----|-----|-----|
| Liquor Potasi | ... | ... | ... | ... | ... | 3 i |
| Acid Carb. Liq. | ... | ... | ... | ... | ... | 3 ½ |
| Aqua | ... | ... | ... | ... | ... | 3 i |
| Prepare mixture 3 oz. | | | | | | |

One teaspoonful to be used in half a tumblerful of hot water, several times a day for 3-4 days.

The wounds in the upper jaw heal better than those in the lower jaw. The reason of it is that the former by the virtue of their position are drained better than the latter. Extraction wounds inflicted under general anæsthesia heal much better than those done under local anæsthesia. The reason of the bad healing power of the latter, is the devitalising action of the drng injected, on the part that already had a low vitality.

Extraction during Pregnancy.

No stage of pregnancy is a bar against the operation of extraction. If because of the severe dental pain or oral sepsis the operation is considered necessary, it can safely be done. There is a belief among women, and which is unfortunately encouraged by a section, if not the whole, of the medical profession, that no dental treatment, much less the operation of extraction should be done during pregnancy, lest it should cause miscarriage or abortion by causing Shock to the fœtus. To those who believe in this bogey of shock it may be pointed out that the very shock they are trying to avoid is constantly operating by the severe tooth-ache and the foul condition existing in the mother's mouth; and that the shock can easily be eliminated by doing the extraction under general næsthesia by Nitrous-oxide. To substantiate the statement that this bogey of shock is false, no three better cases could be cited than those that came under the author's are.

Case No. 1.—A primipara who was gone full term, and was expecting delivery at any moment, was suffering severe pain from a newly erupting but decayed lower third molar. From fear of hurting the still unborn baby, and instilled with



medical man, she bravely bore that dental suffering, till she could bear no more and got well nigh exhausted. The tooth was removed under Nitrous oxide—Ethyl chloride anæsthesia, with no untoward result to the mother or her unborn child. She delivered two days after the extraction, and the delivery was quite normal. A better example than this could not be cited to prove the fallacy of shock by extraction.

Case No. 2.—A multipara who was gone six months, consulted the author for severe pain simultaneously felt in a badly decayed lower molar, and the uterus which was *gravid* at the time. It was difficult to ascertain which pain was the cause and which the effect. As she was a multipara and there was no former history of any morbid condition of the uterus, or any abortion or miscarriage, it was concluded that the tooth was the cause of both these pains. It was extracted under Nitrous oxide-Ethyl chloride anæsthesia with the result that pain in the uterus almost immediately subsided. She carried her pregnancy to full term and passed through normal delivery.

Case No. 3.—A multipara, who was gone six months, was sent to the author by a medical man, for his opinion on the patient's mouth. The patient was feeling some pain in the uterus, and was feeling rundown. There was no history of such pain before, nor of such running down in health at the time of former pregnancies. In the author's opinion she was suffering from the result of septic absorption from the mouth cavity, for she had severe Pyorrhœa Alveolaris. All her teeth, about twenty one in number were extracted under Nitrous oxide Ethyl chloride anæsthesia, with no untoward result to her pregnancy which she carried to full term. The pain in the uterus subsided and she felt better after the extractions.

Extraction during Menstruation.

The operation of extraction unless badly needed should not be done during the period of menstruation. But in case it is badly needed it can be safely undertaken. It will be interesting to cite here two interesting cases of Vicarious-menstruation that came under the notice of the author.

Case No. 1.—A young girl of about 21 was suffering very severe pain for 2-3 days from a badly decayed and abscessed tooth. When she came for consultation she was in her period. But considering the agony she was suffering at the time, extraction was decided upon and done. Bleeding, but for slight oozing, stopped under hot water gargles. This slight oozing from the wound of extraction continued for three days after the operation, and stopped with the menses. During that time there was appreciable decrease of regular menses from the uterus. No attempt was made to stop that bleeding from the wound which was vicarious menstruation, but was allowed to run its course.

Case No. 2.—A young girl had one tooth removed. Two days after the extraction she started bleeding from the wound of extraction. Wound was examined and was found to have practically healed and healthy. There was no history of injury to the part. When asked about her menstrual period she gave the history of the bleeding from the wound having started with her menses, and that this time the flow from the uterus was distinctly less than usual. That bleeding, which was vicarious menstruation, stopped spontaneously with the menses.

While dealing with the subject of bleeding, from the extraction wound, which must not be stopped and allowed to run its course, it will be interesting to cite one interesting

case that came under the notice of the author, where also the bleeding (which was not vicarious menstruation for it was the case of a man) was allowed to run its course.

Case No. 3.—A young man about 30 years in age and who had recently come from British East Africa, came to a charitable dental dispensary for the removal of a tooth. He had a robust constitution. He complained of severe pain in the tooth which was badly decayed, and frequent headaches which were supposed to be due to that tooth. The tooth was removed. The bleeding had stopped before he left. An hour after, he started bleeding again from the wound of extraction. Attempts were made by his family doctor to check the bleeding, but in vain. When he called at the dispensary on the third day after the extraction he was still bleeding though the flow was less than before. The wound was examined and was found to be quite healthy. The patient complained of having suffered during these two days from headache which was distinctly less than, than that of previous two days. He looked flush in the face, and the eyes looked congested. He had a full, rapid, bounding pulse. He said, that though he got frightened of that continuous bleeding, he felt distinctly better than he did for last two days. He naturally was anxious to stop the bleeding which to his surprise and indignation was allowed to go on. In view of the history that

1. Patient got headaches before extraction.
2. Headache lasted after extraction.
3. Patient bled severely for two days.
4. Headache decreased with the bleeding.
5. Bleeding gradually decreased by itself.

6. Patient looked flush and had congested eyes.
7. Patient had full, rapid, bounding pulse.

The author considered that, that wound of extraction worked as a safety-valve, and saved the patient from an attack of Heat apoplexy or Cerebral Hæmorrhage. Patient was dismissed with instructions to

- (a) Keep quiet in sitting posture.
- (b) Keep ice-bag on the head.
- (c) Take a good saline purge.
- (d) Take light diet.

The bleeding decreased considerably on the same day, and entirely stopped on the next. His headache disappeared, and the pulse assumed almost normal character.

Difficulties of Extractions.

As with all other operations there are also difficulties attending the operation of extraction. They may be due to the abnormalities of either the teeth, bone, or the soft tissues. The tooth that is generally most difficult to extract is the third molar, especially the lower, because—

1. It is very often malposed and grows almost under the ascending ramus of the mandible.
2. It is generally firmly embedded in the densely condensed bone.

Difficulty owing to the density of the bone also occurs in connection with the extraction of an isolated tooth. Extraction may become difficult in cases of the bony ankylosis of the temporo-mandibular joint.

Abnormalities of the soft parts may be in the form of naturally narrow mouth, contractions due to old scars, and hypertrophied gums.

Accidents of Extractions.

Accidents that may occur during the operation of extraction are :

1. Fracture of the tooth to be extracted.

This accident is due to

- (a) The failure on the part of the operator to hold the strongest part of the tooth i.e. the top part of the root, in the forceps.
- (b) Failure to destroy the soft tissues binding the tooth to the socket, and to dilate the bony socket by pushing in the beaks of the forceps.
- (c) Sudden or jerky manipulations, and undue force.
- (d) Sudden slipping of the forceps over the tooth.

In case of this accident further attempt may be made to remove the root. In case of that attempt proving abortive further attempt may be put off till after a day or two, when the root may be found to be loose due to the inflammation set up by the former attempts. If the tooth is broken right near the apex of the root, the piece may be best left alone.

Given antiseptic mouth-wash, fomentation and counter-irritant for 3-4 days to allay the inflammation of the laceration of the gums, the root may remain securely embedded in the bone for all times, or may be quietly thrown out by Nature as a sequestrum or in case of trouble from it, it may be taken out at some future date.

2. Fracture of the tooth other than the one to be extracted;

This accident generally occurs during the extraction of a lower tooth. Sometimes as a result of the sudden detachment of the tooth from the socket, or the faulty manipulation of the last stage of the operation, the forceps forcibly strikes the upper teeth, and may cause the fracture of one of them. This accident may also happen during the operation of extraction by an elevator. In this case it is the fulcrum tooth that is usually fractured by the impact of the instrument.

3. Extraction of the wrong tooth.

It is more an act of culpable negligence than an accident. In case of such an accident the tooth must be immediately replaced in its socket, and firmly fixed with the adjacent teeth by means of a splint, or by bandaging both the jaws together. Given aseptic conditions, and firm fixation, the tooth will take root again by the re-union of the detached portions of the nerve.

4. Fracture of the bone.

Fracture of a small piece of the alveolus sometimes takes place in spite of careful manipulations, but is of no serious consequence. Sometimes a big piece of alveolus is broken, due either to the faulty manipulations, or the close adherence (ankylosis) of the bone to the tooth. Complete fracture of the bone though a very rare accident, sometimes does take place in case of extractions of teeth for the necrosis of the jaw.

5. Dislocation of the mandible.

This accident is due to the excessive opening of the mouth by jags during general anæsthesia, or due to the

negligence of the operator in failing to support the mandible during the extractions of the lower teeth. This accident sometimes is unavoidable in certain cases where owing to the mal-development of the Eminentia Articularis, the condyle slips forwards much too easily. In case of such an accident, the dislocation must be promptly reduced, and not allowed to stand for any length of time, for then its reduction becomes more difficult. After its reduction the mandible must be retained in that position for some time by a four-tail bandage.

6. Laceration of the gum.

This is generally due to the want of care in adjusting the forceps on the tooth. In cases of extractions of badly broken roots, this laceration is sometimes unavoidable.

7. Injury to lips and soft parts.

This may be due either to the pressure of the forceps on the lip, or to the slipping of the elevator during the operation.

8. Dislocation of a tooth by the gag.

This accident generally happens during the operation under general anæsthesia. It is due to the adjustment of the gag too far in front of the mouth. It can be easily avoided by adjusting the gag on the back teeth.

9. Rupture of the Inferior Dental Nerve and Blood Vessels.

It is indeed a very rare accident. It may occur in connection with the extraction of the lower third molar when, as rarely is the case, its root is pierced by these

structures. Under such circumstance which cannot be foreseen, the accident is quite unavoidable.

SEQUELÆ OF EXTRACTION.

1. Post Extraction Pain.

This pain may be due to

- (a) The causes existing prior to the operation e.g. suppurative pulpitis, periodontitis, alveolar abscess &c. Some time must elapse before they disappear.
- (b) The undue injury to the bone, gum and other soft tissues.
- (c) The injury to the inferior dental nerve owing to its close proximity to the lower third molars.
- (d) The too rapid closure of the extraction wound causing the retention of the discharge and its subsequent suppuration.
- (e) The fracture of the tooth causing the exposure of the live nerve. This is seldom the case, for the sudden shock of the fracture generally kills the nerve at the outset.

Treatment.

The post extraction pain can be prevented by the routine practice of moulding the socket and soft parts soon after the operation, and advising the use of hot antiseptic mouth-wash for a day or two. The curative treatment will vary according to the cause. If the pain is due to the

fracture of the tooth, the live nerve may be killed by the application of pure liquid Carbolic acid. If due to the rapid closure of the wound, it must be re-opened, drained, and allowed to heal slowly by granulation. This can be done by the frequent irrigation of the wound with a solution like Hydrogen Peroxide. In addition to this treatment the patient may be asked to use antiseptic mouth-wash and apply counter-irritants to the part.

2. Post-extraction Hæmorrhage

Before treating the subject of hæmorrhage, it is necessary to deal with a certain diathesis called Hæmophilia, which predisposes the patient to hæmorrhage. The pathology of this disease is very little known, but it is supposed to be the deficiency of Fibrin, the substance that helps the coagulation of the blood. Great care must be taken in connection with the people known for such diathesis, in observing the following pre-operation and post-operation treatment.

Pre-operation Treatment.

The precautions to be taken before the extraction are :

- (a) To keep the patient on light but nourishing diet for some time before the operation.
- (b) To give Calcium Lactate 10 gr. XV doses 3 times a day for a week before the operation.
- (c) To administer a good purgative over night.
- (d) To rest the patient for two to three days before the operation.

(e) To treat the gums with hot water gargles and application of a paint consisting of Tinc Iodine, Tinc Aconite and Spirit Camphor in equal parts, a week before the operation.

(f) To operate at the patient's house.

Post-operation Treatment.

This treatment consists of

1. Giving ice cold water to gargle.
2. Plugging the wound at once with Tannin or Adrenalin-chloride, with some pressure.
3. Keeping the patient at rest in sitting posture for a day or two after the operation.
4. Keeping the bowels free.
5. Giving light diet.
6. Administering Calcium Lactate in grs. XV doses every two hours till the blood stops, and to be continued in same quantity 3 times a day for other 3-4 days.
7. Injecting horse serum in obstinate cases where the above treatment fails.

Hæmophilia is a rare condition. Most of the cases of profuse bleeding are cases of obstinate bleeding that may be due either

- (a) To impoverished condition of the blood due to poor health.
- (b) To the adherence of the arterial walls to the bone, and consequent loss of contractibility of the muscular fibres.

(c) To faulty treatment.

(d) To the menstrual period if the extraction is done during that time. In this case the bleeding, which is a sort of vicarious menstruation, must not be stopped. It stops with the period.

Like the hæmorrhage in other parts of the body, the alveolar hæmorrhage can also be divided into three classes.

1. Primary *i.e.* occurring at the time of extraction.

2. Reactionary or intermediate *i.e.* occurring a few hours after the extraction. It generally occurs in the night when the patient is in the reclining position in bed.

3. Secondary *i.e.* occurring a week or ten days after the operation. It is due to the sloughing of the blood vessel. It is a rare condition, but is more serious than the other two varieties.

Hæmorrhage is more likely to occur after extraction under local anæsthesia than after general anæsthesia; because of the devitalising action of the drug on the already depressed tissues.

Treatment.

The treatment, soon after the extraction consists in giving either hot or ice-cold water for gargling. Hot water must preferably be used for checking the bleeding, for when stopped with hot water, there are lesser chances of its recurrence, than when stopped with cold water. The reasons

of the greater chances of secondary hæmorrhage after cold water are

1. That there often occurs sudden relaxation of the arterial walls, after their initial contraction by cold.

2. That with cold water there often occurs the sloughing of the surrounding tissues, involving also the arterial walls. The effect of cold is to devitalise the part that is already depressed by the pathological condition that needed the extraction.

Sometimes Tincture of Hamamelis may be advantageously added to the water.

In case the bleeding still persists, then pressure on the point of bleeding may be applied and maintained for some time after the operation. In case of even the pressure failing to stop the bleeding, some styptics like Gallic acid Tannic acid, Adrenalin-chloride may be used. It must be remembered that all these drugs have to be used with pressure.

While referring to the styptics, the medical practitioners may be cautioned against Perchloride of Iron, the drug most used by them for the purpose.

This drug must be avoided, because

1. Of the free acid contained in it, it is injurious to the enamel of the teeth.

2. It predisposes to serious secondary hæmorrhage by the formation of a weak coagulum which is easily soluble in the serum, and by causing the sloughing of the soft tissues and involving also the arterial walls.

In some cases of more severe and obstinate bleeding, some internal treatment may also be needed. It consists of the administration of drugs such as Ergot, Calcium-lactate, Gallic acid, Adrenalin-chloride etc. The choice of the drug varies according to the condition causing the bleeding. If the bleeding is due to the want of coagulability of the blood, drugs like Calcium-lactate or Gallic acid are indicated, but if it is due to the want of contractibility of the arterial walls, drugs like Ergot and Adrenalin-chloride will be found useful. The reader may be advised to avoid the use of Adrenalin-chloride, for the blood-pressure raised by this drug more than counteracts its local hæmostatic action.

In very extreme cases horse-serum may be injected into the blood current; or as the last recourse the external carotid artery may be ligatured.

3. SEPSIS AFTER EXTRACTION.

Though it is impossible to keep the mouth in sterile condition, or treat it antiseptically, yet there is no part of the body that is so tolerant of the injury, or in which sepsis so rarely leads on to systemic troubles. In spite of this fact it is imperative that the dentist should observe all the rules of asepsis and antisepsis observed in surgery of the other parts of the body. Sepsis after extraction can be easily avoided by the use of antiseptic mouth-wash before and after the extraction, and proper sterilisation of all the instruments of the operation. Sepsis is more common after extractions under local anæsthesia, than after operation under general anæsthesia. This is explained by the extreme depression caused in the part by the devitalising action of the drug used in the injection. It is a common experience that the wounds inflicted under general anæsthe-

sia heal sooner and better than those inflicted under local anæsthesia.

Treatment.

The treatment of sepsis consists of the frequent irrigation of the wound with some antiseptic solution, preferably Hydrogen Peroxide; and subsequent application of drugs like Iodine, Zinc-chloride, and Silver-nitrate inside the socket. Iodine must be used in the form of tincture, and Silver-nitrate in the form of 10 p.c. solution in water or preferably in Absolute alcohol or Rectified spirit.

Before concluding this chapter of sepsis or infection, slight reference may be advantageously made to the infection with Syphilis. In the interest of their other patients, it is essential that dentists and medical men must be able to recognise the manifestations of this disease in the mouth cavity. Ignorance of the dentist of this subject and the neglect of the medical practitioners in informing the dentist of the presence of the disease in patients referred to him, may result in the infection by the dentist of one patient from the other. There should not exist any professional secrecy between the medical practitioners and dentists.

4. Surgical Shock after Extraction.

As in the case of all other operations, there is a certain amount of shock attending this operation of extraction. This fact must serve as a contraindication against extensive extractions especially in weak, frail subjects. The expensiveness of the operation varies with the skill of the operator, the efficiency of his means to obliterate the shock, and the constitution of the patient. Administration of general

anæsthesia is the best way to avoid the shock. Unless in case of urgency, extensive operation (extraction of more than 7-8 teeth) may be avoided even under general anæsthesia. Curiously enough some patients, however weak, bear the shock of several extractions at a time so well, while some equally weak patients feel the shock of only one extraction so badly that they almost collapse. One such case came under the author's notice. A lady aged about 30 years was brought in his surgery supported by her companion. She was for last several days suffering severe tooth-ache from a badly decayed tooth; and was very weak because of indifferent health for last several months. She was examined for the condition of the heart and lungs, and was found fit for the operation under general anæsthesia. The tooth was removed under gas. A few minutes after recovery from gas she began fainting, and in spite of all the usual remedies, she well nigh collapsed till practically no pulse was felt. As a last recourse injection of *Digitalis* and *Strychnine* was given and she began rallying. The true history of the case was that she was a chronic invalid with an ulcer of the stomach, who could not retain even milk, and not a patient gone weak only because of indifferent health. The author was told this history by a medical man, after the incident.

Treatment.

The patient must at once be put in a horizontal position, and all the garments round the neck, chest and abdomen loosened to facilitate free breathing. The patient may be given *Ammonium carbonate* to smell. In cases where this treatment fails, some stimulant mixture (consisting of *Spirit ammoni aromaticus* and *Spirit etheris nitrosi*,

equal parts) or a dose of Brandy may be given internally keeping the patient warm all the time. In severer cases hot water bottles may be applied to the limbs, and sides of the body. Artificial respiration, massage of the heart, and injection of heart stimulants like Digitalis and Strychnine may also be resorted to.

5. Epilepsy and Hysteria.

These conditions often occur after the operation of extraction especially in subjects that are predisposed to these conditions. These sequelæ occur more after operations with local anæsthesia than with general anæsthesia. The treatment of these conditions hardly falls within the scope of this work.



CHAPTER XXII.

ANÆSTHESIA.

Anæsthetics used for dental operations are ;

1. Local

2. General.

Local Anæsthetics.

Local anæsthetics are the drugs which when applied or injected locally, temporarily destroy sensation in the area, by interfering with the function of the sensory nerve endings. The method of producing local anæsthesia are :—

1. Application to the part, of some volatile drugs which act by suddenly lowering the temperature in the part by their rapid evaporation, and so temporarily paralyse the sensory nerve endings. The drugs used for this purpose are Ethyl-chloride and Ether. Of these the first is the most used by the dental profession.

The utility of this method is very restricted, for

1. It cannot be used in all parts of the mouth. They can only be conveniently used in the front of the mouth.

2. It produces an anæsthesia of very short duration.

3. By its sudden chilling of the part it causes severe pain, especially in cases of exposed pulps.

4. It should not be used in patients with low vitality, and in old age, for it produces a condition likened to frost bite, which may terminate in gangrene of the part.

5. It should not be used in cases of severe inflammation lest it should cause gangrene.

The method of using the spray of these drugs is

- (a) To protect the parts other than that to be operated.
- (b) To well dry the part to be operated.
- (c) To direct the spray from a distance of 3-6 inches, and with *only* a small jet.
- (d) To stop the spray as soon as the part is blanched, as further spraying may lead to gangrene of the part.
- (e) To operate as quickly as one can, the anæsthesia being of very short duration.

Medical practitioners may be advised to avoid this method, for the anæsthesia produced is generally very unsatisfactory.

2. Injection into the tissues, of the drugs that temporarily destroy sensation in the part by interfering with the function of the sensory nerve-endings.

This method has its advantages and disadvantages.

Its advantages are

1. No preparation of the patient is needed as in the case of general anæsthesia.

2. It can be given before or after food, and preferably after food, as then the patient can stand it better.

3. It allows longer time for the operation than Nitrous-oxide anæsthesia.

Its disadvantages are:

1. The patient gets nervous, being conscious of what is being done.

2. Post-operation pain is severer than after general anæsthesia.

3. Greater chances of post-operation hæmorrhage than after general anæsthesia.

4. The wounds don't heal so well as after general anæsthesia, because of the severe devitalising effect of the drug on the tissues.

5. The last and the most serious disadvantage: the depressent action of the drug (Cocaine) generally used for the purpose, on the heart; and that it is to be avoided in subjects of heart and lung diseases.

The drugs used for the local injections are Cocaine, Novocaine, Procaine, Eucaine, Stovain &c. Of these the first two are most used by the dental profession. Novocain must be preferred to Cocaine for it is not half so toxic as the other.

The Dental Syringe and the Needle :

The Syringe needed for the purpose, is stronger and bigger than the usual hypodermic syringe. It is made so because it has to overcome a considerable resistance generally offered by the fibrous gum-tissue. The syringe must be graduated, and it must not leak. The needle must not be so long as the usual hypodermic needle.

Technique of Injection :—

The patient must be asked to rinse the mouth, and the part to be injected must be painted with Iodine, before the

puncture is made. The puncture should be made midway between the gum-margin and the apex of the root, on both sides of the tooth. The needle must go into the gum-tissue and not superficially under the mucous membrane only. The dose generally used in case of Cocaine is half a grain dissolved in ten minims of distilled water. Half of this solution must be injected on each side of the gum. In case of Novocaine the dose generally injected is 1-2 C. C. (17-34 minims) of 2 p. c. solution.

The time allowed between the injection and the operation varies with the drug used. It is 5-7 minutes with Cocaine and 2-3 minutes with Novocaine.

While injecting, if it is noticed that the piston of the syringe goes in easily without any resistance, the needle must at once be withdrawn, for it means that the needle is gone only under the mucous membrane and not in the gum tissue as it should, or that the needle has penetrated a vein in the gum tissue, and therefore the fluid is directly injected into the blood current and not in the gum tissue as it should be. Under the last circumstance the patient immediately shows the toxic effects of the drug.

Toxic Effects.

These effects are the same in case of Novocaine and Cocaine, but more subdued in case of the former than of the latter. These toxic effects are

1. Giddiness.
2. Pallor.
3. Sweating and cold clammy skin.

4. Slow, feeble pulse, becoming feebler in serious cases.
5. Unconsciousness.
6. Convulsions.
7. Dilated pupils.

8. Impaired respiration resulting in asphyxia and perhaps death.

Treatment.

The treatment of these toxic effects, consists first in stimulating the circulatory system by the administration of drugs like Spirit Ammoni Aromaticus, hot Coffee, Brandy &c. In severer cases drugs like Strychnine and Digitalis may also be injected hypodermically. In cases of the difficulty of respiration, the patient must be laid flat, all the garments round him loosened, and artificial respiration resorted to.

General Anæsthesia.

Drugs used in dentistry for the production of general anæsthesia are Nitrous-oxide (commonly called the Laughing gas), Ethyl-chloride, Ether and Chloroform; or various combinations of all these drugs.

Of all these drugs, the most used by the dental profession is Nitrous-oxide. It is used when anæsthesia of very short duration (half to one minute) is required; but in cases where longer anæsthesia is needed, the mixture of this gas with other drugs, is used. The mixtures generally used are Nitrous-oxide and Oxygen; Nitrous-oxide and Ether; Nitrous-oxide and Ethyl-chloride. Though Nitrous-oxide and Oxygen method is used by most of the dentists, the

author considers the Nitrous-oxide and Ethyl-chloride as a better and more convenient method, because,

1. It needs a smaller and simpler apparatus.
2. It is as safe as Nitrous-oxide alone or any of its combinations.
3. It is free from any after effects.
4. It is cheaper.

Of all the drugs used in dentistry Chloroform is the most unsuitable and the most dangerous drug. Its use in dentistry must be severely condemned. All anæsthetics in dentistry must be given in sitting posture.

Procedure of Administration.

It is not proposed to deal here with the methods of administration, for it hardly comes within the scope of this work, but only to mention some important points to be remembered while giving anæsthetics. These points are,

1. Not to give a general anæsthetic immediately after a full meal;
2. To instruct the patient to have only a light meal and that too, 2-3 hours before the time for administration;
3. To remove all garments like collars, ties, belts, corsets &c.
4. To remove artificial teeth, if there be any;
5. To seat the patient in the chair with the head erect in line with the body, and not thrown back as to stretch the neck.

6. To ask the patients especially women and children to evacuate the bladder before the administration. This is a precaution against the involuntary passage of urine at some stage during the period of unconsciousness.

7. To have a third party to stand by during the administration of general anæsthetics to females. This precaution is to guard the dentist against the false charge of misconduct imagined by the patient as a result of erotic dreams during the period of unconsciousness. There are instances of dentists having been sued on this score, but happily honourably acquitted, on proving that the impression was the result of the hallucination during the period of unconsciousness.

8. To keep the mouth open with mouth-props before giving the anæsthetic.

Nitrous-Oxide Anæsthesia.

The anæsthetic property of this drug is not due to the displacement of Oxygen in the blood or to partial asphæxia, but to its getting into loose combination with the hæmoglobin of the red blood corpuscles. In such combination it is conveyed to the nerve-centres on which it has a specific action. Sometimes patients present the appearance of asphæxia during the period of unconsciousness, but that may be due to the faulty administration when the patient is deprived of the proper quota of air, or to some impurity in the gas itself. Nitrous-oxide by itself, when properly administered, has a stimulating effect on the heart; but when improperly used, or injudiciously mixed with air, or oxygen, it has a contrary effect. It produces anæsthesia of very short duration, about 30-60 seconds.

Stages of Nitrous-Oxide Anaesthesia.

First Stage.

As the gas is turned on, the patient becomes conscious of a sweetish taste. Then he feels warmth on the lips, and commencing numbness of the limbs. As he goes under more, the breathing becomes quicker and deeper. The pulse also is quick, firm and full. Patient though seemingly unconscious, is conscious to sound, and may be easily aroused from the effect of gas if strict silence is not observed in the room.

Second Stage.

In the begining of this stage the patient is unconscious, but is not fully anaesthetised to pain. On further administration he becomes unconscious to pain also. At this stage movements of the limbs are not uncommon; and the patient may dream erotic dreams. The pulse becomes quick and full, and the respirations are deeper and quicker than in the first stage. Conjunctival reflex persists and the pupils begin to dilate. At this period of the second stage, the administration of the anaesthetic must stop for the patient is quite unconscious and anaesthetised for the operation.

Third Stage.

It is generally unnecessary and even dangerous to put the patient in this stage of anaesthesia; and if possible this stage must be avoided. In this stage the respirations become irregular, and snorting and stertor become noticeable, more if the head is thrown too far back. The pulse becomes quicker but feebler than in the second stage,

The muscles first of the limbs, and then of the whole body, get into clonic convulsions. When convulsions occur in the face, the patient presents an unpleasant appearance. Pupils get fully dilated, the conjunctival reflex also disappears, and the eye-balls rotate in an unpleasant manner. As all these symptoms described mean danger, this stage must always be avoided. Besides as said above, this stage is not necessary for the ordinary purposes of dentistry. If by accident any of these symptoms appear, further administration must be immediately stopped, and the patient may be given air or oxygen to breathe.

Recovery.

When the face-piece is removed and the patient has had two to three breaths of air, the narcosis begins to lighten, and the stage of anæsthesia passes into that of analgesia with excitement. This is a condition in which the patient becomes conscious, but is still slightly unconscious to pain; and in which a loose tooth or two can be safely extracted. The pulse begins to slow down and soon becomes normal. The skin assumes the normal colour, and respiration also resumes its normal rhythm. The Conjunctiva regains its reflex and the patient becomes quite conscious.

After-effects of Gas-Anæsthesia.

After-effects of Nitrous-Oxide gas are practically nil. There is no known anæsthetic which produces less constitutional disturbance than this gas. Sometimes slight head-ache and fainting occur after the administration of gas, but they are generally due to

1. Some impurities in the gas.

2. Faulty administration.

3. The patient having had food before taking gas. In this case severe nausea, vomiting, pallor of the face and fainting may also occur. The pallor and fainting are due more to the stomachic disturbance than to any circulatory disturbance resulting from gas itself. A typical case of this nature came under the notice of the author.

A medical man long suffering from tuberculosis of the lung, came for the extraction of a tooth under gas. He was given instructions about food and, asked to come the next day. The tooth was extracted under gas. Two minutes after the recovery from gas he complained of giddiness, and was looking quite pale. He was immediately put flat on the sofa, and was given Ammonium Carbonate to smell. He looked paler than before and had slow soft pulse, which gradually became feebler till it could hardly be felt. Stimulant mixture was given, but to no avail. A dose of Digitalis and Strychnine was prepared and the moment it was ready to be injected, the patient vomitted a copious quantity of practically undigested meal. Immediately after the vomiting the pulse began recovering and became normal, and he recovered consciousness. The patient had a splitting headache for the day, as a result of that severe stomachic disturbance.

As mentioned above Nitrous-oxide gas can be given in combination with other drugs, and these combinations are

1. Nitrous Oxide + Oxygen
2. " " + Ether
3. " " + Somnoform
4. " " + Chloroform
5. " " + Ethyl-chloride.

It is not proposed to discuss the methods of administration of these combinations, for such discussion is outside the scope of this work. However a few words on the Nitrous oxide-Ethyl-chloride method, which to the author's mind is the cheapest, simplest, and most convenient method, may with advantage be said here.

Nitrous-Oxide + Ethyl-Chloride Anæsthesia.

As is well known to all, the safest rule in the administration of anæsthetics is to give the smallest dose that may do for the requirement. In no other method is this rule observed more than in the case of Nitrous-oxide+Ethyl-chloride method, where the dose of one gallon of Nitrous oxide gas, and 1·2 c.c. of Ethyl-chloride is seldom exceeded. If needed this dose can be exceeded unto 3-5 c.c. but such a need never arises for the purposes of ordinary dental operations. In this method the patient is allowed to breathe five or six inhalations of Nitrous-oxide, from and in the bag. Then as the patient begins feeling dazed, as is shown by the slight rotation of the eye balls, the Ethyl-chloride is poured in the bag, to be breathed in for about 25-30 seconds. By this time the patient becomes fully anæsthetised and ready for the operation. This method gives a nice quiet anæsthesia of about a minute or two or a little more according to the dose of Ethyl chloride and the time allowed for its inhalation. Anæsthesia of a minute or two, is about all that is needed for the purposes of ordinary dental operations. The advantages of this method are :—

1. It is very convenient to use :

2. It gives longer anæsthesia than that produced by either drug used singly.

3. It is quite safe and can be given to patients of all ages, and all sorts of conditions. The author, who has a considerable experience of this method, has used it in patients verging in age from 3—73 years, and in all sorts of conditions like pregnancy, mental derangements, renal, heart and lung diseases. In hospital practice he has used it in patients too weak to get out of bed. No condition is a bar against the use of this method. When such splendid methods of anæsthesia as Nitrous-oxide + Ethyl-chloride or Nitrous-oxide + Oxygen anæsthesia are possible and available, the author is surprised that the medical profession has not so far thought of utilising these methods for the purpose of minor operations such as incising of an abscess or a whitlow, dressing a small wound, removing of tonsils and adenoids &c.



CHAPTER XIII.

EMPYEMA OF THE ANTRUM.

It is not proposed to go deep into this subject, but to discuss it from the dental point of view only. The suppuration in the Antrum of Highmore is frequently due to the infection from dental troubles, owing to the close proximity of the roots of some of the teeth to the floor of the antrum. Very often a very thin partition of bone or only the mucous membrane, separates these roots from the antral cavity. The teeth in such close proximity are the Canines, Premolars, and Molars.

Septic infection in or about any of these teeth, especially the molars, may cause the infection of the antral cavity. In the case of pus in the antrum, the medical practitioner may be advised to think first of dental trouble as its cause, and so search for it in the mouth. The dental troubles that may give rise to this condition are

1. Badly decayed tooth

2. Apparently entire tooth, which may be septic inside. Such tooth is generally recognised by the loss of colour, tenderness to touch, and inflammation of the gum around it.

3. Local suppurative inflammation of the periodontal membrane.

4. *Pyorrhæa alveolaris*.

For the signs, symptoms and diagnosis of this trouble the reader may be referred to any textbook of surgery.

Treatment.

The dental treatment of the ampyema of the antrum of dental origin consists of the removal of the offending tooth. In case of acute condition, the pus generally drains out of the socket from which the tooth is extracted. But in case it does not, the antrum is to be perforated through this socket. In case of the first molar, the antrum is best perforated from the socket of its anterior outer root, for it opens into the antrum more than any other. When no particular tooth is the offender and the antrum needs opening from the mouth cavity, the Canine-fosa is the best place for the puncture. After making a good opening the antral cavity must be frequently irrigated with some non-irritating antiseptic fluid such as normal saline solution or boracic acid solution. The opening in the mouth has to be kept patent for the purpose of irrigation till the antral condition gets normal. Under this treatment acute cases heal readily; but chronic cases may require more extensive operation, involving the puncturing of the antrum through the nose, or even removal of the whole of its anterior wall.

CHAPTER XXIV.

INTERFERENCE WITH THE TEMPORO MANDIBULAR JOINT.

This condition, commonly called the lock-jaw is due to several causes, among which there are the following dental causes which are mainly responsible for it. These dental causes are:—

1. Difficult eruption of the third molars especially the lowers.
2. Inflammation around other molars.
3. Cicatricial bands stretching from the maxilla to the mandible, as a result of previous ulceration.

The first cause is the most frequent and the most potent cause of the closure of the jaws. In this case the closure is due to the inflammatory infiltration of the soft tissues round the offending tooth. As a result of that infiltration, that side of the face is swollen, hot and tender, and the mouth can be opened to a small extent only and that too by force. In these cases there is generally acute inflammation and even suppuration in the region of the offending tooth. Spasmodic closure of the jaws (true lock jaw) as a result of the nerve irritation due to the difficult eruption of the third molars, is a very rare condition. True lock-jaw, as in case of Tetanus, unlike this closure is a very painful condition.

Cicatricial bands due to the previous ulceration of the oral mucous membrane are not an uncommon cause of this condition.

Treatment.

The treatment of the lock-jaw of dental origin consists of the removal of the offending tooth or teeth, to be followed by hot fomentations with hot anodyne mouth wash, like poppy-head water; and application of counter-irritants to the gums in and about the region of the offending tooth. In case it is not possible to remove the offending third molar, immediate relief may be afforded by the extraction of the tooth in front of it.

CHAPTER XXV.

FRACTURE OF THE JAWS.

Fractures are more common in the lower than in the upper jaw. This is because of the more exposed position of the lower jaw to injury than the upper, and because of the reduction of the strength of this bone by the insertion of long big roots of the teeth

Fracture of the Mandible.

Causes.

1. Direct injury.

2. Injudicious extraction of a tooth. In this case it is the alveolus only that is generally fractured, and very rarely the body of the bone.

Position.

The usual site of fracture is in the horizontal ramus, and the most frequent point is the Canine-fosa, the weakest part of the jaw owing to the insertion of the long root of the Canine. The other sites in order of frequency are the regions of the mental foramen, symphysis, and the angle of the jaw. The fractures in the horizontal ramus are almost always compound towards the mouth cavity. The fractures in the ascending ramus are rare, but when they do occur they are generally at the neck of the condyle and coronoid processes. In this part the fractures are almost always simple, because of the covering of thick muscles on both sides of it.

Signs and Symptoms.

They are well marked in the case of fractures in the horizontal ramus, but less marked and often obscured in the case of the ascending ramus. These symptoms are

1. Pain at the site of fracture on opening the mouth.
2. Mobility in the position of fracture.
3. Crepitus.
4. Patient supports the part to prevent pain from the movement in the position of fracture.
5. Irregularity in the line of teeth.
6. Difficulty in the normal movements of the jaw.
7. Inability to close the mouth entirely.
8. Considerable salivation, as is the case in all injuries of the mouth.
9. Want of symmetry in the face, owing to the displacement of the fractured ends.

Displacement.

The displacement varies according to the position and nature of the fracture. In case of the most common fracture *i.e.* through the Canine-fossa, the larger fragment is pulled downwards and backwards by gravity, and by the action of the *Digastric*, *Genio-Hyoid*, and *Genio-hyo-glossus* muscles. The smaller fragment is drawn upwards and forwards by the action of the muscles that close the jaw *viz.*

the Masseter and Temporal muscles; and also slightly overlaps the bigger fragment.

In case of the double fractures through both the Canine fossas, the middle fragment is considerably depressed by the downward pull of the depressor muscles of the lower jaw; while the lateral fragments are drawn up by the action of the elevators of the mandible. In case of the fracture at the angle of the mandible, the smaller fragment is drawn upwards by the elevator muscles of the mandible, and inwards by the action of the External-Pterygoid muscle; while the bigger fragment is pulled down by the depressors of the chin.

In case of the fractures behind the attachment of the Masseter muscle or of the ascending ramus, there is not much displacement, owing to the close envelopment of the part, by the muscles on both sides.

In case of the fracture of the Condyle there is deflection of the chin towards the affected side, and not away from it as in the case of the unilateral dislocation of the mandible. This is an important point in the differential diagnosis.

Treatment.

The simplest and the most readily applicable method is the four-tail bandage. It is a very useful, but temporary measure. The disadvantages of this method are

1. As the mandible is tied to the maxilla, and the mouth is closed, there is considerable difficulty in mastication.
2. As the mouth is constantly closed there is considerable difficulty in cleaning it.

3. Owing to the backward pull, and inward pressure of the bandage, the displacement of the fragment cannot be corrected.

Interdental Splints.

A very good and useful appliance of setting these fractures, is a wire splint called **Hammond splint**. Its advantages are.

1. It is easily made.

It is made by bending and adapting the soft iron wire to the lingual and labial sides of the teeth, as near the gums as possible but not impinging on them, and joining the ends with soft solder. This is done on a plaster model secured from the impression of the mouth.

2. It is easily applied.

When ready the splint is adjusted in the mouth in the same position as on the model, and then secured by ligaturing it with the teeth, avoiding the teeth immediately adjacent to the fracture. On both sides, the two teeth next to the one adjacent to the fracture must be ligatured, and after that the alternate tooth. The method of ligaturing is to pass one end of an iron binding wire over the outer bar of the splint and under the inner bar on the same side of the tooth. Then with the tip of the index finger of the left hand guide it over the inner bar on the other side of the tooth, and then under the outer bar. Having done this the two ends must be twisted together and safely secured under the outer bar of the splint.

3. It is very comfortable to the patient; for he can conveniently work the movements of the jaw for the purposes of speech and mastication.

4. It is less septic than any other splint ; for the teeth and the splint can easily be cleaned by the patient.

In case of fractures in the front of the mouth, another good device that can be recommended is a dental splint made to cover 3-4 teeth on each side of the fracture.

There are several kinds of splints designed by different men, but when there are a few good and firm teeth on each side of the fracture, the *Hammond Splint* is undoubtedly the best.

Another good method which is more a surgical than a dental process, is the *treatment by wiring*. In this method the fragments are brought together, and retained in that position by means of strong wire sutures. In this method great attention must be paid to asepsis during the operation, and proper articulation of upper and lower teeth.

All through the treatment, whatever the method used, the mouth must be kept scrupulously clean; or else severe sepsis may supervene and lead to the necrosis of the jaw.

In case of the fracture at the angle of the mandible, adjustment of the fracture by means of a guttapercha splint extended upto and round the angle, and supported by a four-tail bandage is all the treatment needed. The treatment in case of the fractures in the ascending ramus consists of the application of a four-tail bandage to keep the fragments fixed.

Fracture of the Maxilla.

Fracture of the maxilla is much less common than that of the mandible. It may be caused by direct violence such

as a kick or a blow or a gun-shot injury. It may also be caused by an injudicious extraction. Such accident mostly happens during the extraction of the third molars, when the tuberosity at the back of the maxilla gets fractured.

The fractures of the maxilla are usually compound in the mouth cavity, due to the close adherence of the soft tissues to the bone. These fractures are often attended with severe hæmorrhage, due to the great vascularity of the bone. The fractures of the maxilla heal sooner and better than those of the mandible. This is because of the greater vascularity of the part, and because of only slight displacement that usually occur in these fractures.

Treatment.

The treatment of these fractures, consists of the application of splints. The variety of splint to be used, will depend upon the situation of the fracture.

CHAPTER XXVI.

DISLOCATION OF THE MANDIBLE

The dislocation of the mandible may be uni-lateral or bi-lateral, the latter being more frequent.

Causes.

1. Direct violence.
2. Sudden muscular action.
3. Opening of the mouth too wide.
4. Downward push during the extraction of the lower teeth, without supporting the jaw underneath.

Pathology.

In this condition the condyles pass under and in front of the *eminentia articularis*, owing to the sudden contraction of the Masseter and Internal Pterygoid muscles. Temporo-mandibular ligaments are only stretched in this condition and seldom torn.

Signs and Symptoms.

In bi-lateral dislocation the symptoms are—

1. Mouth open and rigid.
2. Lower jaw protruding.
3. Dribbling of the saliva.
4. Masseter muscles stretched and contracted.

5. Condyles felt in the wrong position in front of the Eminentia articularis.

6. Hollows felt behind the condyles.

In case of uni-lateral dislocation the symptoms are:—

1. The mouth not so wide open as in bi-lateral dislocation.

2. The mandible displaced on one side. In this case the jaw is pushed away from the affected side. This sign distinguishes the condition from the fracture of the condyle in which the chin is pushed towards the affected side.

3. The Condyle felt in the wrong position, only on one side.

Treatment

The treatment consists in pushing back the condyles to the original place, by making them retrace the path they traversed in coming in front of the Eminentia articularis.

Technique of the Operation.

Seat the patient in a lower position in front of the operator. The operator then puts his thumbs well covered with lint, on the back teeth on each side as far back as he can manage, and supports the patient's chin from underneath with his four fingers of both hands. Having done this, with his thumbs he must push the jaw downwards and backwards, at the same time elevating the chin upwards with his fingers. By such manipulations the condyles can be made to retrace the course they took in their passage forwards. After the reduction, the mandible

must be fixed in that position by a four-tail bandage for a week or two. Very often some general anæsthesia is needed for this operation to overcome the tonic contraction of the Masseter and External Pterygoid muscles, that generally occurs during dislocation.

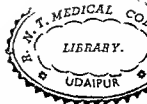
With some patients with loose joints these dislocations occur very easily and frequently.

Such patients may be taught to reduce it themselves, and may be advised to wear an elastic support.

Dislocation must be reduced as soon as possible, for when allowed to stand for some time, the reduction becomes more difficult.

Sub-luxation.

It will be interesting to note here a condition called Sub-luxation which is somewhat akin to dislocation. In this condition the patient complains of clicking on opening of the mouth, and some difficulty in mastication and closing of the mouth. It was once supposed to be due to the looseness of the ligaments, but is now understood to be due to some formative changes in the joint, the result of osteo-arthritis. It generally occurs in old persons.



CHAPTER XXVII.

DRUGS USED IN DENTISTRY CAUSTICS.

Arsenic—Arsenic is used in very small doses $1/60$ — $1/15$ gr. for killing the dental pulp. It kills the pulp by causing the dilatation and increased permeability of the capillaries. It must not be allowed to leak on the gum, for it then sets up very severe inflammation. It must not be kept in the tooth too long, for then it may pass through the apex of the root and may set up severe periodontitis. It must generally be avoided in teeth with incomplete roots *i.e.* in teeth of children; but if used at all it must not be kept in for more than twelve hours. Arsenic is the active ingredient of all the ready made preparations of devitalising fibres and pastes.

Carbolic Acid—It is frequently used to kill the dental pulp in the teeth of children where Arsenic is contra-indicated because of the incomplete roots. As a very useful mild caustic, it is frequently used to destroy the dentinal fibrils in a sensitive cavity. For this purpose it is applied in pure form and rapidly evaporated with hot air. In case of this acid coming in contact with soft parts during its application to the tooth, it must at once be neutralised by Glycerine.

Zinc-chloride—It is a powerful and penetrating metallic caustic. It is used to de-sensitise the sensitive dentine in shallow cavities. It must on no account be allowed to touch the gum.

Silver-nitrate—It is used for the same purpose as Zinc-chloride. It is more efficacious and less painful than the other. Its great disadvantage is that it stains the tooth-substance black. As the tooth-tissue so stained is less liable to decay,

this drug is deliberately used for arresting caries in the teeth, especially of children. It is often used in cauterising the follicular ulcers of the gums, and the mucous membrane. For use in the mouth, this drug must be first fused on a metal instrument and as such applied in the mouth.

Caustic potash—It is a very powerful and penetrating caustic, frequently used in the destruction of the polypus of the gum or the dental pulp. The part must be cleaned and dried before the application of the drug. As soon as a slough forms as a result of its application, it must be removed and the part washed with hot water.

Counter-Irritants.

A counter-irritant is an irritant, which when applied to the surface, alters the circulation into the underlying parts. They may be

1. Thermal e. g. hot fomentations, or hot poultice in the form of hot figs or raisins.
2. Mechanical e. g. massage, scarification lancing and application of leeches or actual canter.
3. Chemical e. g. application of drugs such as Iodine and Capsicum.

Counter-irritants are supposed to work,

1. By dilating the superficial blood-vessels, and so diverting the blood-current from the underlying tissues. Fomentations, poultices, and hot mouth-washes work in this way.
2. By causing the reflex contraction of the blood-vessels supplying the underlying tissues, by the stimulation of the nerves. Capsicum plasters work in this way.

3. By directly depriving the part of the blood, and so relieving the congestion.

Scarification, lancing, and leeches work in this way.

Capsicum.—This drug is used by the dental profession in the form of ready-made plasters.

Iodine.—Iodine is a very good counter-irritant with penetrating and lasting effect. It is almost always used in combination with Tincture Aconite. In dentistry it is mostly used in cases of gingivitis, and periodontitis and works,

1. By causing a superficial inflammation, and so diverting the blood current from the underlying affected tissues, to the superficial blood vessels.

2. By deep penetration it causes the absorption of the inflammatory products.

3. By working as a disinfectant.

Astringents and local Stimulants.

Astringents are drugs which contract the tissues, and so check the secretion. They lessen the inflammation and hasten the absorption of the effusions.

Local Stimulants are the agents that excite the activity of the cells. Best example of it is **Massage** which works by pressing out the stagnant fluids by the help of increased circulation of the blood and lymph; and by causing the increased nutrition and activity of the tissue cells.

Copper Sulphate.—This drug is used by some people in packing the sockets in *Pyorrhœa Alveolaris*, after the removal of tartar.

Alum.—Because of its highly acid reaction this drug should not be used when there are natural teeth standing in the mouth. It makes a very good astringent and stimulant mouth-wash in an edentulous mouth. It is usually used during the time the patient is waiting for the artificial teeth.

Permanganate of Potash.—In weak solutions 5 grs. to a pint, this drug is much used by the medical profession. It may be advised to avoid the use of this drug, for it stains and softens the teeth, and has an unpleasant taste.

Myrrh.—It is a useful, pleasant astringent-stimulant to the gums. It is generally used as an application to the gums after the removal of tartar. It helps to relieve the inflammation of the gums set up by the irritation of tartar.

R/.

| | | | | | |
|-----------------|-----|-----|-----|-----|-------|
| Tine Myrrh | ... | ... | ... | ... | ℥ i |
| Thymol | ... | ... | ... | ... | gr. i |
| Aqua Chloroform | ... | ... | ... | ... | ℥ iv |

Prepare wash.

To be rubbed on the gums with a tooth-brosh.

Tannic acid.—It is used as a mouth-wash in chronic inflammation of the gums and mucous membrane. It is also used in conjunction with pure Carbolic acid to harden the tooth pulp for the purpose of removal or mummification after its devitalisation by Arsenic.

R/.

| | | | | | |
|-------------------|-----|-----|-----|-----|------|
| Tannic Acid | ... | ... | ... | ... | ℥ ss |
| Eau-de-Cologne... | ... | ... | ... | ... | ℥ iv |

Prepare mouth-wash,

Use 10-15 drops in a tablespoonful of hot water.

Hamamelis.—Liquor Hamamelis diluted in hot water makes a pleasant sedative mouth-wash after extraction of several teeth in one sitting. It also helps to check the bleeding.

Mummifying Agents.

Mummifying agents are the drugs that so alter the tissues, as to render them unfavourable to the growth of the germs, and so to the process of putrefaction. They are used for mummifying the tooth pulp, after its devitalisation by Arsenic. There are sold in the market ready made mummifying pastes containing drugs like Iodoform, Tannic acid, Formaline, Alum &c.

Styptics or Hæmostatics.

Styptics or Hæmostatics are the agents that prevent or check the bleeding. These agents work

1. By their effect on the blood itself of coagulating it, and thus blocking the puncture in the blood-vessel.
2. By contracting the arterial walls, and so closing the lumen of the artery.
5. By coagulating and contracting the peri-vascular tissues, and so compressing and closing the ruptured blood-vessel. The agents used in dentistry are,

Heat and cold.—They work by causing the contraction of the muscular fibres of the walls of the arteries, and so closing the lumen of these vessels. Of the two, heat is more efficacious and more rapid in its action. Another great advantage of heat is that there are fewer chances of secondary hæmorrhage than with cold, for it does no

exhaust the muscular fibres as cold does. Bleeding after extractions must be stopped with hot water gargles. Water so used must be as hot as the patient can bear and not luke-warm. Cold water when used for the purpose must be ice-cold. In case of extractions of inflamed teeth, or in case of old people with bad gums, cold water must be avoided. Such low temperature may so lower the vitality of the part as to cause its sloughing or gangrene.

Drugs.

The drugs to work as styptics may be applied locally to the part, or may be given internally by the mouth, or hypodermically. They then work by either coagulating the blood itself, or constricting the blood-vessels. The use of drugs as hæmostatics should always be avoided, in cases where the bleeding points are accessible; and heat or cold, preferably the former, or pressure must be used. The objection to the use of some drugs is that they frequently cause inflammation, and consequent sloughing of the part, and so increase the chances of secondary hæmorrhage. Whenever the drug is needed it must be used only as an auxiliary, under pressure as the primary agent. The drugs used in dentistry as styptics are,

Perchloride of Iron.—This drug is mostly used by the medical profession and unqualified dentists for this purpose. They may be advised to avoid this drug because of its tendency to cause sloughing of the part, and consequent secondary hæmorrhage. It must be used only as a last resort.

Tannic Acid.—It works by its powerful condensing or tanning action on the perivascular tissue, thus constricting the lumen of the artery. It must be used in powder form and under pressure.

Hamamelis or Witch-hazel.—This drug is often used in hot water as a mouth-wash for post extraction hæmorrhage. It makes a nice pleasant and soothing mouth-wash.

Gallic Acid.—It is often used locally under pressure, or given internally.

Calcium Lactate.—This is a very useful and powerful hæmostatic. It is given internally in 15 grs. doses, every two hours till the bleeding stops. It works by coagulating the blood. Plaster of Paris (Calcium sulphate) is sometimes used locally, as a last recourse when all other means have failed.

Ergot.—It is generally given internally by the mouth, or injected hypodermically. It works as a general hæmostatic by contracting the unstripped muscular fibres, and so closing the lumen of the blood-vessels. This drug must be avoided in case of pregnant women, from fear of causing the abortion.

Adrenaline chloride.—It is a very good local hæmostatic when applied under pressure, or hypodermically injected in the part. It works by constricting the muscular fibres of the arterial walls, and so closing the lumen of the artery. Medical practitioners may be advised to avoid giving this drug internally, for by its action on the heart it so raises the blood-pressure, that its effect on the arterial walls is easily counteracted. This drug is often used along with Cocaine when it is used as a local anæsthetic. It is then supposed to localise the narcotic effect of Cocaine, and to lessen the post-extraction hæmorrhage. When so used, contrary to the expectation, there is a greater chance of secondary hæmorrhage, than when Cocaine is used alone. The reason of it is supposed to be the sudden and severe relaxation of the muscular fibres of the arterial walls, as the result of their

exhaustion after their severe and protracted contraction caused by this drug.

Antiseptics, Disinfectants and Deodorants.

Perchloride of Mercury.—1 in 2,500 solution of this drug is sometimes used as a mouth-wash, especially in subjects of Syphilis. But for its toxic effect and unpleasant taste it would make a good disinfectant mouth-wash. In 1 in 1,000 solution it is used by some for washing out the pus pockets in case of *Pyorrhœa Alveolaris*.

Silver-nitrate.—This drug is frequently applied to the carious teeth of the children for the purpose of arresting caries. It is often used for disinfecting septic wounds.

Hydrogen peroxide.—It is a very good antiseptic. On account of its slightly acid taste it is much liked and used by people as a mouth-wash. It is frequently used in dentistry for dressing the root canals, and washing out the pus-pockets in *Pyorrhœa*, and the abscess cavities.

Iodine.—It is a fine powerful disinfectant. It is frequently applied to the inflamed gums; and then besides working as a counter-irritant it works as a disinfectant to the pockets of the gum.

Carbolic Acid.—It is a very useful antiseptic and disinfectant. It makes a good mouth-wash for use after extractions.

R/.

| | | | | |
|--------------------|-----|-----|-----|------|
| Liquor Potassae... | ... | ... | ... | 3 i |
| Acid Carb. Liq.... | ... | ... | ... | 3 ss |
| Aqua | ... | ... | ... | 3 i |

Prepare solution.

One teaspoonful to be used in half-tumblerful of hot water several times a day.

It is most commonly used as a dressing in carious cavities to allay the pain, and to disinfect them. It is also used as a dressing in root canals. In 1 in 20 solution it makes a useful disinfectant for the delicate dental instruments.

Creosote.—It has the same effect as Carholie acid. Owing to its unpleasant odour it is given up in favour of Carholie acid.

ANTACIDS.

Magnesium Carbonate.—It is the best antacid at the disposal of the deotist. It is a useful drug for the arrest of Caries, and allaying the sensitiveness of the dentine in superficial cavities. Very frequent use of this drug is undesirable for it tends to the formation of tartar. It is used most in the form of milk of magnesla.

Liquor Potassae.—It is a very good antacid. But its effect is very transitory for it is rapidly washed away by saliva.

Sodium Bicarbonate.—It is sometimes used as an antacid but is weaker than Liquor Potassae.

Local Anæsthetics-Anodynes-Obtundents.

Local anæsthetics are means that temporarily destroy the sensation in the part by temporarily paralysing the sensory nerve endings. Cocaine is the drug generally used for this purpose.

Anodynes are the means used locally to relieve pain. Examples of these are Morphia or Cocaine used with

Arsenic in devitalising pastes; and Aconite used with Iodine in the gum-paint.

Obtundents are the means used in dentistry to deaden pain in the sensitive dentine. Extreme heat, Carbolic acid, Silver-nitrate &c. are the agents generally used for this purpose.

Cocaine Hydrochloride.—It is a powerful poison to all forms of protoplasm, and acts by paralysing the sensory nerve endings. It is used as a local application to the part, or it is injected into the part. When injected in the body it has a strong depressant effect on the heart, and causes the following symptoms of poisoning.

1. Fainting.
2. Rapid and weak pulse.
3. Difficulty of breathing.
4. Dilatation of pupils.
5. Convulsions.

These symptoms must immediately be treated by

1. Administration of stimulants.
2. Amyl Nitrite inhalation.
3. Putting the patient in lying posture.
4. Application of warmth to the body.
5. In extreme cases artificial respiration.

For the production of local anæsthesia it may now be advised to drop Cocaine in favour of much less toxic drugs like Eucaine or Novocaine. Hypodermic injection of about 15-20 mins. of a 4 p.c. solution of these drugs, will make a nice local anæsthetic for dental extractions.

Opium.—In the form of Tincture of Opium it is a useful and popular remedy for the relief of tooth-ache. It is frequently used in the form of Poppy-head fomentations (gargle) for the relief of pain.

Oil of Cloves.—It is frequently used in dentistry for the relief of pain from the exposed or inflamed tooth-pulp. It then works by its sedative effect on the nerves, or by resolving inflammation by dilating the blood vessels.

Camphor.—In form of the Spirit of Camphor it is used in combination with Iodine and Aconite, as an application for inflammation of the gums.

Aconite.—It is frequently used in conjunction with Iodine as an application for inflamed gums. It then helps to relieve pain.

Alcohol.—In form of Brandy or Whisky held in the mouth is a very popular and useful remedy for tooth-ache. It is used as an obtundent for sensitive dentine. In this case it has to be rapidly evaporated by hot air.

Carbolic acid.—It is often used as a local anodyne. In pure condition it is one of the most powerful remedies for pain of an exposed or inflamed tooth-pulp. It is generally the chief ingredient of the many quack tooth-ache cures sold on the market. It is also used as an obtundent for desensitising the sensitive dentine. In 1 in 20 strength it may be used in the socket after extraction, to prevent the post-extraction pain.

Silver nitrate.—It is a powerful obtundent generally used for desensitising the sensitive dentine. It works by coagulating the protoplasmic contents of the dentinal tubes. One great disadvantage of this drug is that it

stains the tooth substance black; hence it cannot be used in front teeth.

Zinc chloride—Its action is the same as Silver nitrate, but less powerful. It can be used in front teeth.

Ethyl-chloride—Because of the intense cold produced by its rapid evaporation it is frequently used to anæsthetise the part of operation. It is sprayed on the part till it becomes white. The operation must then be quickly performed for the duration of anæsthesia is very short. This method of rapid freezing must not be used in

1. Old subjects.
2. In patients with weak circulation.
3. In inflamed parts.

4. In case of an extraction of a septic tooth or an operation on a septic part, for the sudden chilling is likely to cause the sloughing of the part.

5. In case of the exposure of the tooth-pulp, for its sudden evaporation will cause intense pain.

Specifics.

The specific drugs useful to the dentist are,

1. Antistomatatic e. g. Chlorate of Potash and Borax.
2. Antisymphilitics e. g. Mercury and Potassium Iodide.
3. Antiscorbutics e. g. Lime or Lemon juice.

Chlorate of Potash—In 10 grs. to 1 oz. strength this drug makes a very efficacious mouth-wash in cases of ulcerative stomatitis. It may also be given internally

in 10 gr. doses to an adult ; an in case of children it can be given in as many grains as the age of the child upto six years. The advantage of giving it internally is that after working its effect through the blood it is excreted in the mouth unchanged and so is again useful locally.

Borax—In form of Glycerinum or Mel Boracis is a very efficacious wash for Aphthons or Thrush stomatitis amongst infants.

Potassium Iodide—It is almost a specific in tertiary syphilis. It may be given by itself, but mostly with Mercury (mixed treatment). It is also given internally for removing metallic poisons like Mercury and Lead from the tissues.

Mercury—It is a specific in primary and secondary stages of syphilis. During the treatment by this drug the mouth must be kept very clean, for this drug is excreted by the mucous glands and the gingival organ, and is then likely to set up inflammation. In presence of septic conditions, this inflammation may culminate into ulceration and even sloughing of the part.

Lime or Lemon juice—Both these juices make an efficacious curative and preventive remedy for Scurvy.

CHAPTER XXVIII

CLEANSING OF THE MOUTH.

A. Mechanical methods.

B. Chemical methods.

Mechanical Methods.

Mastication.

Mastication and the free movements of the tongue, lips, and cheeks are efficient cleansers of the teeth; and without these cleansers of Nature it is not possible to keep the oral cavity clean. Hence the advisability of the use of such hard food as would call forth the action of mastication.

Tooth-brush.

A tooth-brush is an essential item in the toilet of the mouth. As the function of a tooth-brush is to rub the teeth clean, it is natural that it should have hard bristles.

Requisites of a good brush.

1. It must have a suitable curve that would help it to reach the teeth in the back of the mouth.
2. The bristles must be hard.
3. The bristles must be bleached.
4. The bristles must be arranged in rows, with spaces between them. This arrangement will help the bristles to pass in and clean the spaces between the teeth.

5. The bristles in the end rows must be longer than in the middle rows. This arrangement will enable it to clean the back teeth.

The tooth-brush must be used both horizontally and vertically on both the surfaces of the teeth. The gums must also be lightly scrubbed with the tooth-brush. Such use of the brush on the gums will not only clean them but also massage them. Cleaning and massaging of the gums is as essential to oral-hygiene, as the cleaning of the teeth with a tooth-brush.

Bawal or Limb Sticks.

These twigs are almost universally used in India for cleaning the teeth. One end of this stick is chewed till it is frayed, and then that frayed end is used as a brush to clean the teeth. All sorts of virtues have been claimed for these twigs. As they have their virtues so they have also their faults. It is observed that the mouths of those who use these twigs though remarkably free from caries i.e. decay of the teeth, are generally full of tartar and pus under the gum margins. It may be interesting to ascertain if this condition of Pyorrhœa Alveolaris is really due to the Bawal or Limb twigs, or due to the Pan-sopari, for generally both these things go together. Pan-sopari is distinctly harmful to the teeth and gums, and certainly contribute to the causation of this trouble, but is not solely responsible for it. Bawal and Limb twigs certainly have their share of that responsibility.

Tooth-pick.

It is a very useful and in some cases very necessary means of cleaning the spaces between the teeth. It must be

small, pliable, and made of quill or celluloid. Metal picks must be avoided for they are too thick to penetrate, too stiff to fit, and are likely to damage the enamel of the teeth.

Silk.

It is a very good means of cleaning the inter-dental spaces; but it is very difficult to use. It is to be passed in between the teeth near the gum margin, and worked to and fro.

Tooth-powders.

Given a clean mouth to start with, especially when the teeth are brushed twice a day (morning and last thing in the night) the tooth-powders are not necessary. A good use of a hard tooth-brush twice a day will be quite enough to keep that mouth clean. But as human efforts are not always perfect and cannot be always depended upon, some sort of plain powder may be advised, to add to the scrubbing action of the tooth-brush. It must be noted that such only is the use of a tooth-powder. The plainer the tooth-powder the better it is. It is not necessary for a tooth-powder to have antiseptic or germicidal drugs for they are not essential, and besides it is scarcely possible to use them in such strength as would kill the germs in the mouth and that too in the short time that they remain there, and yet not destroy the tender mucous membrane. The medical profession and the lay public may be warned against the so-called antiseptic and germicidal tooth-powders on the market and against the use of antiseptic and astringent drugs like Carbolic acid, Salol, Myrrh, Camphor, Menthol, Beetle-nut, Magnesium-carbonate, Chlorate of Potash &c. in powders for daily use. These drugs are useful in certain conditions of the mouth,

but their routine use in tooth-powders must be condemned. Precipitated chalk (*Cretae Precipitatae*) slightly flavoured with some essential oil and perfumed with some perfume of one's choice will make as good a tooth-powder as one would want to use.

R./

| | | | |
|----------------------------|-----|-----|---------|
| Cretae Precipitatae | ... | ... | ℥ i |
| Pulvis Iridis | ... | ... | gr. xxx |
| Olei Caryophylli | ... | ... | m. xx |
| Otto Rose | ... | ... | m. iii |

Of this powder, the precipitated chalk is the most essential ingredient. The other ingredients though not quite essential are useful adjuncts, for they improve its taste, and excite the flow of saliva which is highly conducive to the welfare of the mouth.

Tooth-pastes.

If it is true that the only object of the tooth-powder is to add to the scrubbing action of the tooth-brush, and true it is, then to use the tooth-paste is to frustrate that very object ; for instead of working as a cleanser or detergent as the powder, by the virtue of its main ingredient or base (lanoline, vaseline, glycerine, gelatine, soap), it will work as a lubricant, as is often noticed by the unclean and slimy appearance of the teeth. This objection alone is enough bar against the use of it as a dentifrice; but besides this there are other more serious objections against it. They are,

1. Its main ingredient or base is a sugary and fermentable substance; and such fermentable substances should not be brought in contact with the teeth.

2. It sticks to the surface of the teeth, and in the spaces between them.

3. Not only does it stick by itself but also helps the fermentable food-stuffs to stick on the top of it.

4. By its constant contact at the neck of the teeth, it has a softening effect on the enamel and the gums.

Though these pastes are extensively used by the lay public, and encouraged by the dental and medical practitioners, the author, after exhaustive observation, strongly condemns them. He has come to this conclusion, by a routine practice of taking patients off these pastes, and keeping them to powders, and watching the beneficial effects on the condition of their mouths.

Tooth Soap.

Due to its alkalinity and soapy or glossy feel it is useful in certain conditions like Erosion and Attrition cavities. But its routine use in place of powder must not be encouraged.

Chemical Methods.

Mouth-washes.

For purpose of dental toilet they enjoy considerable popularity with the lay public, and dental and medical profession. How they have come to enjoy such popularity, it is hard to tell, for it is the experience of those given to keen observation, that there are more unclean mouths amongst the users of these washes, than amongst those who do not. The reason of it is that believing that these washes will kill the germs and keep their mouths clean, they neglect

the most essential thing in dental hygiene, the diligent use of the tooth-brush. For the reasons described in case of tooth-powders, these mouth-washes cannot and do not do any good in the mouth. Some of the best known and expensive commercial solutions have often been tested, and found wanting in the antiseptic and germicidal properties claimed for them. Certain conditions of the mouth may necessitate some chemical solutions as mouth-washes, as mentioned in this table.

| Conditions | Mouth-wash containing |
|--|--|
| 1. Ulcerative stomatitis | Chlorate of Potash |
| 2. Aphthous and Thrush stomatitis | ... Borax |
| 3. Septic wounds | ... Carbolic acid, Hydrogen-peroxide. |
| 4. Syphilitic stomatitis. | ... Hydrarg-perchloride. |
| 5. Chronic inflammation of the mucous membrane. | ... Rectified spirit, Alcohol, Tannic acid. |
| 6. Gingivitis | ... Tannic acid, Myrrh. |
| 7. Acid condition of the saliva, Erosion cavities. | ... Sodium bicarbonate, Magnesium carbonate. |
| 8. Raw surface of the tongue or mucous membrane. | ... Glycerine, Tragacanth. |

But as soon as the necessity is over the wash must immediately be dropped. Habitual use of a mouth-wash must be discouraged for as said above the patients seeking false security behind them, neglect the diligent use of a tooth-brush.

CHAPTER XXIX.

SOME USEFUL PRESCRIPTIONS.

MOUTH WASHES.

1. For use after extraction.

R/.

| | | | | | |
|----------------------|-----|-----|-----|-----|-------|
| Liquor Potassi | ... | ... | ... | ... | ℥ i |
| Acid Carbolic Liquid | ... | ... | ... | ... | ℥ ss. |
| Aqua | ... | ... | ... | ... | ℥ i |

Prepare solution.

One teaspoonful to be used in half tumblerful of hot water.

2. For septic wounds, and septic conditions of the mouth.

R/.

| | |
|-------------------|----------------|
| Hydrogen Peroxide | } equal parts. |
| Aqua. | |

To be kept in the mouth for 2-3 minutes.

3. For Ulcerative stomatitis.

R/.

| | | | | |
|-------------|-----|-----|-----|---------|
| Pot chloras | ... | ... | ... | gr. xx. |
| Aqua Rosæ | ... | ... | ... | ℥ i |

To be diluted with an equal quantity of water. . . .

4. For highly septic and gangrenous condition of the mouth.

R/.

| | | | |
|-----------------------------|-----|-----|------|
| Liquor Calcis chlorinate... | ... | ... | 3 ii |
| Aqua | ... | ... | o i |

To be used frequently.

5. Antiseptic and astringent wash for chronic inflammation of the mouth.

R/L.

| | | | | |
|-----------------|-----|-----|-----|-----------|
| Boroglyceride | ... | ... | ... | a a. 3 ss |
| Eau-de-Cologne | ... | ... | ... | 3 iv |
| Tinc Cremeria | ... | ... | ... | 3 iv |
| Spt. Vini Recti | ... | ... | ... | 3 iv |

Put a few drops in tablespoonful of water and keep in the mouth for 2-3 minutes.

6. Anodyne mouth-wash for allaying the pain of the general inflammatory condition or exposed nerve in the tooth.

R/.

Boil 12 Poppy flowers in one pint of water, till the water is reduced to half. Use half-tumblerful of it (made hot every time) frequently.

R/.

Brandy or Whisky in hot water, to be kept in the mouth for 2-3 minutes.

7. For pain due to the inflammation of the gums.

R/.

| | | | | | |
|----------------|-----|-----|-----|-----|------|
| Tannic Acid | ... | ... | ... | ... | 8 ss |
| Eau-de-Cologne | ... | ... | ... | ... | 8 iv |

Put a few drops in a tablespoonful of hot water,

8. Astringent wash to be used in the period between extractions and fitting of the dentures.

R/.

| | | | | | |
|--------------|-----|-----|-----|-----|--------|
| Alum | ... | ... | ... | ... | ℥ ss. |
| Zinc sulph | ... | ... | ... | ... | gr. xv |
| Sodi biboras | ... | ... | ... | ... | gr. ii |
| Aqua Rosæ | ... | ... | ... | ... | ℥ iv |

To be used twice a day.

9. For use after the removal of tartar.

R/.

| | | | | | |
|-----------------|-----|-----|-----|-----|-------|
| Tinc Myrrh | ... | ... | ... | ... | ℥ i |
| Thymol | ... | ... | ... | ... | gr. i |
| Aqua Chloroform | ... | ... | ... | ... | ℥ iv |

To be used as gargle diluted with equal quantity of water. But it is better to rub it on the gum with a tooth-brush than to use it as a gargle.

10 Alkaline mouth wash for acid condition of saliva and erosion cavities.

R/.

| | | | | |
|--------------------|-----|-----|-----|--------|
| Sodii Bicarbonatis | ... | ... | ... | g. xx |
| Olej Gaultheri | ... | ... | ... | m. xxx |
| Aqua | ... | ... | ... | ℥ iv |

To be diluted with equal quantity of water.

One teaspoonful to be kept in the mouth for 3 minutes

R/.

Milk of Magnesia.

One tea-spoonful to be kept in the mouth for 3 minutes

Paints or Liniments.

1. For the inflammation of the gums and periodontal membrane.

R/.

Tinc Iodine

Tinc Aconite

Spirit Camphor a a equal parts.

To be painted on the gums.

2. For spongy gums in Pyorrhœa Alveolaris.

R/.

Iodine 15 parts.

Zinc Iodide 30 "

Glycerine 40 "

Water 15 "

To be painted on the gums after syringing of the sockets.

3. For severe periodontitis.

R/.

Iodine gr. x

Pot. Iodide gr. xxx

Glycerine ℥ i

To be painted on the gums.

4. For sensitive erosion cavities.

R/.

Gum Mastic 3 i

Zinc Chloride... .. m v

Chloroform 3 ss.

To be painted on the dentine and allowed to evaporate

5. For sensitive dentine.

R/.

Zinc Chloride gr. xx

Alcohol 3 iv

Chloroform 3 i

To be painted on the dentine and allowed to evaporate.

6. For use inside the pus pockets of Pyorrhœa alveolaris.

R/.

10 p. c. solution of Sulphocarbolate of zinc in Cinnamon water.

To be painted inside the sockets.

R/.

10. p.c. solution of Silver Nitrate in absolute Alcohol.

To be painted inside the sockets.

R/.

Argyrol

Glycerine.

Aqua. a. a equal parts.

To be applied inside the sockets.

Tooth-powders.

1. For daily use.

| | | | | | |
|-----|---------------------|-----|-----|-----|---------|
| R/. | Cretae Precipitatae | ... | ... | ... | ℥ i |
| | Pulvis Iridis | ... | ... | ... | gr. xxx |
| | Olei Coryophylli | ... | ... | ... | m. xx |
| | Otto Rose | ... | ... | ... | m. iij |

To be used with a tooth-brush.

2. Alkaline dentifrice for occasional use when needed.

| | | | | | |
|-----|---------------------|-----|-----|-----|---------|
| R/. | Cretae Precipitatae | ... | ... | ... | ℥ i |
| | Pulvis Iridis... | ... | ... | ... | gr. xxx |
| | Magnesie carbonatis | ... | ... | ... | ℥ i |

To be used with a tooth-brush.

3. Antiseptic dentifrice for use when needed.

| | | | | | |
|-----|---------------------|-----|-----|-----|-------|
| R/. | Cretae Precipitatae | ... | ... | ... | ℥ i |
| | Acid Carbolic | ... | ... | ... | gr. x |

To be used with a tooth brush.



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